

BULLETIN OF MISCELLANEOUS
INFORMATION No. 7 1931
ROYAL BOTANIC GARDENS, KEW

XLVII.—THE GENUS *HAPLOCOELUM*. A. A. BULLOCK.

The Sapindaceous genus *Haplocoelum* was described by Radlkofer (1) in 1878, and was last reviewed by him (2) in 1921. Commencing in 1878 with one species, *H. inoploeum* Radlk., the genus now numbers eight, whilst a ninth species, *H. jubense* Chiov., has been described but should perhaps be referred to another genus on account of the presence of a corolla.

The genus, which is endemic in Tropical Africa, has been assigned to different families—to the Sapindaceae by Radlkofer, to the Simarubaceae by Engler (3). The latter eventually transferred his genus *Pistaciopsis* to the Sapindaceae, and gave a more complete description, but failed to recognise its identity with *Haplocoelum* Radlk. Meanwhile, in working out Welwitsch's Angolan plants, Hiern (4) in 1896 doubtfully referred a fruiting specimen of a plant to the family Burseraceae, where he described it as *Balsamea? foliolosa*. On examination this plant proves to be identical with Engler's *Pistaciopsis Dekindtiana*.

In 1921 Radlkofer reduced *Pistaciopsis* to *Haplocoelum*, making the necessary new combinations and reductions.

It appears that the Rev. T. Wakefield, who collected *Haplocoelum inoploeum* at Mombasa in November, 1894, confused two closely allied plants, which I believe to be distinct species. Both were incorporated in the Kew Herbarium, but only one was distributed. This was described by Engler as *Pistaciopsis Wakefieldii*, which is synonymous with *Haplocoelum inoploeum* Radlk. The remaining part of Wakefield's Mombasa gathering was identified, in 1889, by Radlkofer with his *Haplocoelum trigonocarpum*, a Zanzibar plant first collected by Sir John Kirk. Wakefield's plant is without fruit, but I regard it as distinct, and have described it below as *Haplocoelum mombasense*, sp. nov.

Excellent material is now available of the type-species, *H. inoploeum* Radlk., collected by Mr. R. M. Graham, of the Kenya Forestry Department. This shrub has very hard, strong, interlacing branches, and the small, yellow-scented flowers appear before the leaves. It is known to the Swahili natives as "Mfungu-Tanzu."

(1) Radlk. in Sitz. Math.-Phys. Akad. Muench. viii. 336 (1878).

(2) Radlk. in Engl. et Drude, Veg. der Erde, ix. Pflanzenw. Afr. III. ii. 278 (1921).

(3) *Pistaciopsis* Engl. in Engl., Bot. Jahrb. xxxii. 125 (1902), et l.c. xxxiv. 156 (1904).

(4) Hiern, Cat. Welw. Afr. Pl. i. 126 (1896).

In the closely allied species *H. trigonocarpum* Radlk., the flowers also seem to appear before the leaves. This is a Zanzibar plant represented in the Kew Herbarium by two sheets collected by Sir John Kirk. It is possible that the flowers also appear before the leaves, or when the leaves are very young, in *H. strongylocarpum* Bullock, *H. foliolosum* (Hiern) Bullock, and *H. mombasense* Bullock, but no exact information is available, though the flowers forwarded of these species (none received of *H. foliolosum*), were old and withered while the leaves were apparently still young.

In the following enumeration, the specimens actually seen are indicated by a ! after the collector's number, and are deposited in the Kew Herbarium ; the remaining specimens are cited from descriptions, and the collector's number is followed by the name of the herbarium in which the specimen is preserved.

Haplocoelum Radlk. in Sitz. Math.-Phys. Akad. Muench. viii. 336 (1878) ; et in Engl. et Prantl, Nat. Pflanzenf. III. v. 327 (1896) ; et in Engl., Pflanzenw. Ost.-Afr. C. 251 (1895) ; et in Engl. et Drude, Veg. der Erde, ix., Pflanzenw. Afr. III. ii. 278 (1921) ; Chiov., Res. Sc. Miss. Stefan.-Paoli Somal. Ital. i. 207 (1916), *clavis specierum*.

Pistaciopsis Engl. in Engl., Bot. Jahrb. xxxii. 125 (1902) ; et l.c. xxxiv. 156 (1904).

Key to the species.

Corolla absent ; leaflets subsessile or sessile :

Leaflets in 2-3 pairs :

Fruit globose or ellipsoid, smooth or faintly 3-ribbed :

Fruit densely tomentose.....1. *H. Scassellatii* Chiov.

Fruit glabrous or subglabrous :

Leaflets obtuse, emarginate.....2. *H. inoploeum* Radlk.

Leaflets acute or acuminate.....3. *H. acuminatum* Radlk.

Fruit markedly trigonous.....4. *H. trigonocarpum* Radlk.

Leaflets in 4-9 pairs :

Leaflets equal-sided, in four pairs, obovate-oblong to elliptic.....5. *H. mombasense* Bullock.

Leaflets very unequal-sided, obliquely oblong :

Leaflets in 4-6 pairs, up to 3 cm. long :

Leaves up to 4.5 cm. long ; young branches pilose.....

6. *H. gallaëense* (Engl.) Radlk.

Leaves up to 7 cm. long ; young branches pubescent.....

7. *H. strongylocarpum* Bullock.

Leaflets in 7-9 pairs, up to 1.5 cm. long.....

8. *H. foliolosum* (Hiern) Bullock.

Corolla well developed, of 5 petals ; leaflets long-petiolulate.....

9. *H. jubense* Chiov.

1. **Haplocoelum Scassellatii** Chiov. Res. Sc. Miss. Stefan.-Paoli Somal. Ital. i. 206 (1916).

SOMALILAND. Boscaglia di Arrar, *Scassellati & Mazzocchi* 2, 20 (Herb. Flor.). *Cansuma*, *Scassellati & Mazzocchi* 40 (Herb. Flor.).
The type specimen is not indicated in Chiovenda's description.

2. **Haplocoelum inoploeum** Radlk. in Sitz. Math.-Phys. Akad. Muench. viii. 337 (1878); et in Engl., Pflanzenw. Ost-Afr. C. 251 (1895); et in Engl. et Drude, Veg. der Erde, ix., Pflanzenw. Afr. III. ii. 278 (1921).

Pistaciopsis Wakefieldii Engl. in Engl., Bot. Jahrb. xxxii. 125 (1902); et *l.c.* xxxiv. 157 (1904).

Haplocoelum Wakefieldii (Engl.) Chiov., Res. Sc. Miss. Stefan.-Paoli Somal. Ital. i. 207 (1916), *in clavi*.

KENYA COLONY. Mombasa, Nov., *Wakefield* s.n. (partim)!; *Boivin* 52 (Herb. Mus. Par.—type). Schimba Mts., *Kässner* 205 (Herb. Berol.). Duruma River, March, *Kässner* 287! Malindi District; Mida, on the edge of the forest or bush, a spreading shrub with very hard and strong interlacing branchlets, leafless at the time of flowering, flowers yellow, with a fairly strong scent, fruit oval and slightly ribbed, *Graham* 1560a (flowers)! 1560b (leaves)! 2350 (fruit)!

The native (Swahili) name, according to Mr. Graham, is Mfungatanzu.

3. **Haplocoelum acuminatum** Radlk. in Engl. et Drude, Veg. der Erde, ix., Pflanzenw. Afr. III. ii. 278 (1921), *nomen subnudum*.

ANGOLA. River Lobo.

Native name:—Mut ut' chine.

I have seen no specimens of this plant. The description is embodied in the key above. Presumably specimens are in existence in Germany, but Radlkofer gives no clue to their whereabouts, or to the collector.

4. **Haplocoelum trigonocarpum** Radlk. in Sitz. Math.-Phys. Akad. Muench. xx. 249 (1890), partim, quoad spec. zanzibar.; et in Engl., Pflanzenw. Ost-Afr. C. 251 (1895); et in Engl. et Drude, Veg. der Erde, ix., Pflanzenw. Afr. III. ii. 278 (1921).

ZANZIBAR ISLAND. Without exact locality, *Kirk* s.n. (type).

In the writer's opinion, the specimens cited by Radlkofer are referable to two species, *H. trigonocarpum* and *H. mombasense* (*vide infra*). Since the Zanzibar plant bears fruit, from which the name was taken, I have selected the *Kirk* specimen as the type of this species. This plant never has more than three pairs of leaflets, while the following species has four pairs.

5. **Haplocoelum mombasense** Bullock, sp. nov.; *H. trigonocarpum* Radlk. affinis, sed foliis 4-jugatis, foliolis superioribus minoribus differt.—*H. trigonocarpum* Radlk. in Sitz. Math.-Phys. Akad. Muench. xx. 249 (1890), partim, quoad spec. mombas.

Frutex vel *arbor*, ramulis novellis ferrugineo-tomentellis. *Folia* *matura* glabra, paripinnata vel raro imparipinnata, 4-jugata, usque

5 cm. longa, foliolis subsessilibus obovato-oblongeolatis vel ellipticis apice rotundatis emarginatis basi cuneatis, summis 3 cm. longis et usque 1.8 cm. latis, infimis 1-1.5 cm. longis et circiter 1 cm. latis, rhachi anguste alata, leviter puberula, petiolis 1.5 cm. longis. *Flores masculi*: sepala lineari-oblonga, 2 mm. longa, extra pubescentia; filamenta 2.5-3 mm. longa; antherae exappendiculatae, oblongae, 1.5 mm. longae. *Flores feminei* non visi. *Fructus* non visus.

KENYA COLONY. Mombasa, Nov., Wakefield s.n. (partim)!

6. **Haplocoelum gallaense** (Engl.) Radlk. in Engl. et Drude, Veg. der Erde, ix., Pflanzenw. Afr. III. ii. 278 (1921); Chiov., Res. Sc. Miss. Stefan.-Paoli Somal. Ital. i. 207 (1916), *in clavi*.

Pistaciopsis gallaensis Engl. in Engl., Bot. Jahrb. xxxii. 125 (1902).

SOMALILAND. Galla Highlands (Arussi-Galla-Land), near Ginea-Dumek, 5000-6600 ft., in rocky hollows, Ellenbeck 1963 (Herb. Berol.—type).

7. **Haplocoelum strongylocarpum** Bullock, sp. nov.; *H. folioloso* (Hiern) Bullock affinis, sed foliolis majoribus paucioribus superioribus quam inferioribus majoribus (nec ea subaequantibus) differt.

Arbor, ramulis junioribus satis dense tomentoso-pubescentibus demum fere glabris. *Folia* paripinnata, usque 7 cm. longa et 4 cm. lata, foliolis alternis utrinsecus 4-5 oblique oblongis apice emarginatis basi acutis, summis usque 3 cm. longis et 1.5 cm. latis reticulatis, infimis multo minoribus, rhachi anguste alata, petiolo circiter 1 cm. longo. *Inflorescentia* cymosa, axillaris, multiflora, congesta, foliis multo brevior, pedunculis abbreviatis, pedicellis gracilibus 8 mm. longis. *Flores masculi*: sepala ovato-lanceolata, acuminata, 1.5 mm. longa; filamenta gracilia, 5 mm. longa. *Flores feminei* non visi. *Fructus* laevis, ovoideus vel ellipticus, 1.5 cm. longus, haud trigonus. *Semina* oblongo-ellipsoidea, 1 cm. longa.

KENYA COLONY. Kisumu, a tree, Dobbs 2364!

8. **Haplocoelum foliolosum** (Hiern) Bullock, comb. nov.

Balsamea? *foliolosa* Hiern, Cat. Welw. Afr. Pl. i. 126 (1896).

Commiphora foliolosa (Hiern) K. Schum. in Just, Jahresb. 1899, xxvii. I. 480 (1901).

Pistaciopsis Dekindtiana Engl. in Engl., Bot. Jahrb. xxxii. 126 (1902).

Haplocoelum Dekindtianum (Engl.) Radlk. in Engl. et Drude, Veg. der Erde, ix., Pflanzenw. Afr. III. ii. 278 (1921).

TANGANYIKA TERRITORY. Mwanza, facing Lake Victoria, a shrub 10 ft. high, frequent on kopjes (no flowers or fruits), Nov., Burtt 2908!

ANGOLA. Huilla; in rocky places along the cataracts of the river of Lopollo and Monino, rather rare, Dec., fr., Welwitsch 4507! (type); Mucha Mts., 6000 ft., in rocky places, Dekindt 216 (Herb. Berol.—type of *Pistaciopsis Dekindtiana* Engl.).

9. **Haplocoelum jubense** Chiov., Res. Sc. Miss. Stefan.-Paoli Somal. Ital. i. 56 (1916); et l.c. 207, *in clavi*.

This plant is very completely described by Chiovenda. The presence of a corolla suggests that *H. jubense* should be referred to some other genus.

SOMALILAND. Duchia, July, Paoli 464, 465 (Herb. Flor.); Revai sul Giuba, July, Paoli 477 (Herb. Flor.); Uascianle, Scassellati & Mazzocchi 76 (Herb. Flor.).

XLVIII.—CONTRIBUTIONS TO THE FLORA OF TROPICAL AMERICA: VII.* N. Y. SANDWITH.

NEW AND NOTEWORTHY LEGUMINOSAE AND ROSACEAE FROM BRITISH GUIANA.

LEGUMINOSAE.

Clitoria javitensis (H.B.K.) Benth. in Journ. Linn. Soc. ii. 42 (1858); in Mart. Fl. Bras. xv. pars i. 123 (1859).—*Neurocarpum javitense* H.B.K. Nov. Gen. et Sp. Pl. vi. 409 (1823).

An opportunity occurred recently of examining the type material of this species in the Herbarium of the Muséum d'Histoire Naturelle, Paris. The leaflets are ovate-lanceolate, 9–15 cm. long and 4.5–6.5 cm. wide; they have scattered adpressed hairs beneath, but these have fallen from some parts of the surface which are consequently glabrous. The bracteoles have fallen, but a single example in the capsule on the sheet is, as described, very short, 3 mm. (1½ lines) long. The calyx is, as described, 2.2 cm. (10 lines) long, and is 8–9 mm. wide. The shorter teeth are very short, triangular-acuminate, 3–4 mm. long, 4 mm. wide; while the longer subulate tooth is 6 mm. long in the best example. The whole calyx is adpressed whitish-pilose. The standard is densely adpressed-pilose over the whole of the outer surface, and this indumentum gives it a greyish-purple colour. The flattened lamina of the standard is about 4 cm. long and 3.5 cm. wide, while the claw is about 1.2 cm. long.

Of the specimens in Herb. Benth. and Herb. Hook. which have been compared with this plant, the one which agrees best with it and which may safely be identified with it is *Spruce* sine numero, from San Carlos, Venezuela, collected in August, 1853. The calyx, calyx-teeth and indumentum of the standard of this collection agree very well with those of the Humboldt and Bonpland type, and the pedicels and bracteoles agree with the description. The only discrepancy is in the leaflets, which are broader and glabrous beneath, but it is obvious from a comparison of numerous specimens that a considerable range of variation must be looked for in the shape, venation and clothing of the leaflets of the plants of this group. Another specimen which may be identified with the type is on the

*Continued from *K.B.* 1931, p. 188.

Kew sheet of *Spruce* 2320 from San Gabriel, Rio Negro, May 1852, but there is material from two different collections on this sheet, and one of them agrees with the large series of plants to be discussed later. *Spruce* 1877, from the Rio Negro, Oct. 1851, has the dense indumentum of the standard of the type, but the calyx, and above all its teeth, are much longer, and the bracteoles are rather longer (up to 5 mm.).

This sheet is of importance as it shows a transition towards a large quantity of material from Guiana and Amazonian Venezuela which differs remarkably from the type in the large much longer calyx-teeth, in the much more glabrescent outer surface of the standard which dries a pale colour, and in the long, glabrescent, conspicuously striate bracteoles. The leaflets of this series vary considerably and in one sheet (*Spruce* 3543) they are scattered-pilose beneath as in the type of *javitensis*. At first sight it seemed as if this set of plants represented a distinct species, but the evidence of *Spruce* 1877 is against any such supposition, and even within the series itself there is much variation in the length and position of the bracteoles, and in the size of the calyx and corolla; it is clear that the distribution of the two forms and their intermediates overlaps. *Ducke* 23406, from Manaos, Rio Negro, agrees well with *Spruce* 1877.

Fortunately, this large series of distinct-looking specimens already has the following valid name:—

var. **glabra** *Sagot* in Ann. Sci. Nat. sér. vi. 13. 299 (1882) emend.; a typo bracteolis longioribus, dentibus calycinis conspicue majoribus longioribus, vexillo extra glabrescente siccitate pallente differt.

FRENCH GUIANA. Karouany, 1857, *Sagot* 120 (type coll.).

BRITISH GUIANA. *Schomburgk* 1000; Rockstone, 1919-20, *Hitchcock* 17309; *ibid.*, 1921, *Gleason* 543; dense upland forest, Butukari, July 1921, *Gleason* 714; Demerara River, Nov. 1888, *Jenman* 4930; grant opposite Bartica Grove, Nov. 1886, *Jenman* 2498; Moraballi Creek, Essequibo River, Nov. 12th, 1929, *Sandwith* 599. The last-named collection was a low-growing rope, in wallaba forest; flowers on the old wood, very handsome; bracteoles green; calyx pale reddish-green; standard boat-shaped, very large, a lovely pale mauve, with violet stripes in the centre within; keel and wings much shorter, white; laminae of wings slightly cohering to keel.

BRAZIL. San Gabriel, Rio Negro, May 1852, *Spruce* 2320 (mixed gathering).

VENEZUELA. Tomo, Rio Guainia, San Carlos, Aug. 1854, *Spruce* 3543.

Dalbergia Riedeli (*Radlk.*) *Sandwith*, comb. nov.—*Hecastophyllum Riedeli* Radlk. in Koepff, Uber anat. char. Dalberg. 41 (1892). *H. Monetaria* Pers. var. *Riedeli* Benth. in Mart. Fl. Bras. xv. pars. i. 229 (1862) partim, quoad *Spruce* 1546.

BRAZIL. Barra, Rio Negro, May 1851, *Spruce* 1546 (type coll.) ; Rio Negro, Oct. 1851, *Spruce* 1879.

BRITISH GUIANA. Upper Demerara River, Sept. 1887, *Jenman* 4086 ; Moraballi Creek, Essequibo River, August 1929, *Sandwith* 53 ; lowland forest, Rockstone, July 1921, *Gleason* 527 ; bank of Essequibo River, Rockstone, July 1921, *Gleason* 893 ; Mazaruni River, June 1889, *Jenman* 5251.

Unfortunately, the Riedel specimen which is the type of Bentham's variety appears to be quite distinct from the above large and uniform series. Radlkofer did not see this specimen, and made *Spruce* 1546 the type of his species, conjecturing that Bentham had correctly identified the two as representing the same plant.

Machaerium Quinata (Aubl.) *Sandwith*, comb. nov.—*Nissolia Quinata* Aubl. Hist. Pl. Guianæ, 743, t. 297 (1775). *N. ferruginea* Willd. Sp. Pl. iii. 900 (1803). *Machaerium ferrugineum* Pers. Syst. ii. 276 (1807) ; Benth. in Mart. Fl. Bras. xv. pars i. 253 (1862), ubi synonyma cetera citantur.

Climber at mouth of the Moraballi Creek, Essequibo River, Oct. 18th, 1929, *Sandwith* 481.

Distr. Widely distributed over Guiana and Amazonian Venezuela and Brazil. Aublet's specimen at the British Museum has been verified and compared.

Clathrotropis brachypetala (Tul.) *Kleinh.* in Rec. Trav. Bot. Néerl. xxii. 398 (1925).—*Diploctropis brachypetala* Tul. in Arch. Mus. Par. iv. iii. (1844).

Moraballi Creek, Essequibo River, Aug. 28th, 1929, *Sandwith* 136. Tall tree on bank of small creek or gully, its favourite habitat. Leaflets green on both sides. Calyx brown. Fl. dirty white.

Vernacular name (Arawak), Arumatta.

Distr. St. Vincent (native ?), Trinidad, Guiana.

Aldina insignis (Benth.) *Endl.* in Walp. Rep. i. 843 (1842).—*Allania insignis* Benth. in Hook. Journ. Bot. ii. 91 (1840).

Moraballi Creek, Essequibo River, Nov. 15th, 1929, *Sandwith* 618. Tall tree, 138 ft. high, 92 ft. to the first fork, 30 in. diam., in sandy mora forest by the right bank. Leaflets 5-7, glaucescent beneath.

Vernacular name (Arawak), Dakamaballi.

Distr. Endemic? All the sheets at Kew, with the exception of Robert Schomburgk's original collection from the Upper Essequibo and Rupununi Rivers, are from the Lower Essequibo and the creeks which flow into it near Bartica.

Swartzia xanthopetala *Sandwith*, sp. nov. ; facie *S. tomentosae* (Willd.) DC., ab hac ac affinibus stipulis minoribus, bracteolis sub flore conspicuis persistentibus, ovario longo angusto ut stipite styloque glaberrimo differt ; a *S. grandifolia* Bong. ex Bth. atque *S. picta* Spruce ex Bth. rhachi foliorum nuda statim distinguenda.

Arbor mediocris, 22.5 m. alta, ramulis summis densissime tomentosis, annotinis pullis, novellis ferrugineis. *Folia* imparipinnata, 3-9-foliolata, vulgo 7-foliolata, 12-30 cm. longa; petiolus subteres vel supra anguste canaliculatus, densissime ferrugineo-tomentosus, 2-5 cm. longus; rhachis similis, omnino exalata, supra canaliculata, internodiis 1.2-4 cm. longis; petioluli 2-3 mm. longi; foliola lateralia oblonga vel obovato-oblonga, terminalia vulgo obovata, apice obtusa saepius rotundata brevissime mucronulata, raro subacuminata, basi obtusa saepius rotundata, 3-15 cm. longa, 2-7 cm. lata, chartacea, supra nervis impressis rugulosa nitidula, costa ferrugineo-tomentosa, ceterum pilis albis laxis deterrentibus plus minusve dense conspersa, subtus pallidiora costa nervisque reticulatis densissime ferrugineo-tomentosis ceterum etiam passim laxe pilosula, nervis primariis utroque costae latere vulgo 10-14 versus marginem arcuantibus ac anastomosantibus; stipulae satis parvae, ovatae, ad 4 mm. longae atque 3 mm. latae. *Inflorescentiae* infra folia in ramulis annotinis defoliatis surgentes, solitariae vel geminae, crebrae, racemosae, saepius flexuosae, 5-20 cm. longae, vulgo 4-12-florae, passim (pedunculus, pedicelli, bractae, bracteolae, alabastra) densissime ferrugineo-tomentosae; bractae ovatae, concavae, 2-4 mm. longae, circiter 3 mm. latae; pedicelli sub flore aperto 1.2-2.2 cm. longi; bracteolae sub calyce ipso positae atque saepe ei adpressae, angustae, oblongo-lineares, 2-3 mm. longae, 0.5-1 mm. latae, post petali lapsum persistentes. *Alabastra* matura ovoideo-subglobosa, 7-10 mm. diametro. *Calyx* in lobos 4 ad basim fissus; lobi elliptico-ovati, 1-1.2 cm. longi, 5-6 mm. lati, extra densissime ferrugineo-tomentosi, intus glabri statu vivente virides. *Petalum* aureum, valde venosum, orbiculato-cordatum, 3 cm. longum atque latum, margine integro vel obscure sinuato-lacerato, extra basi ac in ungue necnon secus venas pilosum, intus glabrum; unguis 3 mm. longus. *Stamina* filamentis aureis, glabris; majora circiter 15 quam minora numerosissima subduplo longiora. *Ovarium* longum, angustum, glaberrimum, statu vivente viride, siccitate nigrum, 2-2.5 cm. longum, 1-1.75 mm. latum, subrectum vel saepius curvatum, sensim in stylum glabrum colore eodem praeditum 6-8 mm. longum attenuatum; stipes glaber, circiter 7 mm. longus. *Fructus* non visus.

BRITISH GUIANA. Moraballi Creek, Essequibo River, Oct. 7th, 1929, *Sandwith* 388 (type). Tall tree, 74 ft. high, 9 in. diam., in wallaba forest on ridge. Branchlets, veins of lower surface of leaflets, and inflorescence all ferrugineous-tomentose. Leaflets wrinkled and slightly shining above. Petal and filaments bright yellow. Sepals green inside, ferrugineous-tomentose outside. Ovary and style green and glabrous.

Demerara River, Aug. 1888, *Jenman* 4505.

The nearest affinity of this species is perhaps *S. picta* Spruce ex Benth., which differs in its winged leaf-rhachis, its larger more

acuminate leaflets, and above all in its much larger conspicuously sinuate-dentate petal, which Spruce noted as resembling an oak-leaf.

S. Benthamiana *Miq.* Stirp. Surinam. Sel. 15 (1850).

Moraballi Creek, Essequibo River, Oct. 19th, 1929, *Sandwith* 488. Tall tree, 92 ft. high, 13 in. diam. The species is scattered in wallaba forest on sandy ridges. Petal and filaments pure white. Blaze with purplish-red juice.

Vernacular name (Arawak), Itikiburaballi.

Distr. Guiana, Amazonian Brazil.

The leaflets of this species vary rather considerably in texture and venation, according to age and development. The present material agrees best with Spruce's collection (1843) from the Rio Negro which, as Bentham pointed out in the *Flora Brasiliensis*, exhibits certain points of difference from the typical plant of Surinam and Cayenne; but the longer filaments of *Sandwith* 488 are always sparsely pilose when carefully examined under a lens, whereas in Spruce's plant they are said by Bentham to be quite glabrous.

Sclerolobium guianense *Benth.* in Hook. Kew Journ. Bot. ii. 237 (1850).

Moraballi Creek, Essequibo River, Oct. 11th, 1929, *Sandwith* 423. Tall tree, 122 ft. high, 18 in. diam., in greenheart forest. Stipules remarkably pectinate. Panicles very conspicuous. Sepals creamy-white. Petals 0 or rudimentary. Filaments golden-yellow with golden-yellow hairs below. Young ovary ferrugineous-tomentose on the margins.

Vernacular name (Arawak), Yawarridan.

Distr. Guiana. Not recorded by Ducke from Pará. Schomburgk's original collection is the only other British Guiana sheet at Kew, but the tree is probably not uncommon.

Cassia pteridophylla *Sandwith* in Kew Bull. 1928, p. 375.

Moraballi Creek, Essequibo River, Sept. 23rd, 1929, *Sandwith* 323. Tall tree, 90-100 ft. high, 12 in. diam., in wallaba forest on sandy ridge. Fl. bright yellow.

Vernacular name (Arawak), Immirimiaballi; not Iriariadan, as was originally suggested.

This species is confined to the wallaba forest, where it is abundant. It is satisfactory to note that the emarginate character of the leaflets, which immediately distinguishes it from *C. adiantifolia*, was found to be absolutely constant in the leaves both of seedlings and of mature trees.

C. leiandra *Benth.*, var. **guianensis** *Sandwith* var. nov.; a planta typica foliolis angustis oblongis, facie saepius subrectangulari, lateribus insigne subparallelis, apice rotundatis vel emarginatis, 0.7-4.4 cm. longis, 0.6-1.6 cm. latis, indumento subtus praesertim costae multo minus conspicuo differt.

BRITISH GUIANA. Moraballi Creek, Essequibo River, Oct. 25th, 1929, *Sandwith* 521 (type): tall tree, 100 ft. high, 13 in. diam., in mixed forest; young leaflets red; fl. bright yellow. Eberoabo River, Berbice River, May 1919, *Hohenkerk* in Forestry Department record no. 790: tree 77 ft. high; fl. golden-yellow with strong, sweet perfume. Ite Creek head, Kuruabaru River, Demerara River, *Hohenkerk* in ditto, no. 790A: tall tree, with light-yellowish sapwood and dark red-brown heartwood; flowers orange to vermilion.

Vernacular name (Arawak), Warua.

Bauhinia (§ *Tylotea*) **scala-simiae** *Sandwith* sp. nov.; *B. cupreonitenti* Ducke affinis, indumento faciei inferioris foliorum longiore atque laxiore, floribus majoribus multo longius pedicellatis, alabastris sine lobis apicalibus cernendis, calyce insigne alato alis spiraliter plicatis differt.

Frutex ingens alte scandens atque per summas arbores late pervagans; caulis vel truncus denique ad 1-2 pedes latus, insigne compressus atque transverse regulariter ita costatus ut gradus praebat scalam simulet. *Folia plantarum incipientium* in terra repertarum late ovata vel suborbicularia, majora ad trientem vel ultra biloba, lobis erectis vel in foliis maximis subdivaricatis sinu triangulari latissimo breviter ad 5 mm. mucronato, insigne longe vulgo 2-3 cm. anguste cuspidatis, basi truncata vel profunde ad 2 cm. cordata, 6-25 cm. longa, 5-25 cm. lata, supra viridia glabra, subtus indumento sericeo adpresso pulcherrime pallide cupreonitentia, tenuiter papyracea, 9-11-nervia, rete venularum supra subtilissimo; petiolus ut caulis densissime ferrugineo-villosus, 3-18 cm. longus. *Ramuli summi fruticis maturi* sulcati, vulgo 3-5 mm. diametro, indumento rubro-ferrugineo villosus densissime vestiti; cirrhi oppositi, 2-6 cm. longi, juventute indumento simili praediti, tum indurati cinerascens. *Folia matura* late ovata vel suborbicularia, juniora superiora semper simplicia integra apice siccitate plicato ad 5 mm. mucronata, seniora maxima integra vel nonnunquam ad 2 cm. biloba lobis late triangularibus vel brevissime acuminatis sinu latissime triangulari, omnia basi cordata vel cordato-truncata, 4-24 cm. longa, 3.5-23 cm. lata, coriacea, fortiter 9-nervia, supra glabra nitida siccitate olivaceo-purpurascens vel nigricans nervis impressis rete venularum subtilissimo inconspicuo, subtus indumento duplici, et minute adpresse pilosula, et dense praesertim nervis venulisque satis longe atque laxe ferrugineo-villosa, conspicue reticulata; petiolus indumento ramulorum densissimo indutus, vulgo satis brevis, 1-9 cm. longus, sed nonnunquam in foliis inferioribus ad 20 cm. longus. *Racemi* axillares, 5-20 cm. longi, satis pauciflori atque laxiflori, indumento ramulorum omnino simili; bractae lanceolatae vel spathulato-lanceolatae, 3-5 mm. longae, circiter 1.5-1.8 mm. latae, extra indumento racemi indutus, intus glabrae, purpurascens; bracteolae similes, in medio vel saepius supra medio pedicello positae, spathulatae vel oblongae, ad 6 mm.

longae, bracteis saepe paullo latiores ad 2 mm. latae; pedicelli indumento racemi praediti, maturi 1-1.6 cm. longi. *Alabastra* ovoideo-subglobosa, circiter 8 mm. longa atque lata, nitentia, densissime rufo-pilosa, lobis apicalibus carentia. *Calyx* 1-1.2 cm. longus, 1.2-1.7 cm. latus, ore truncato, lobis obscuris triangularibus, extra indumento racemi ramulorumque densissime vestitus, intus dimidio inferiore glaber, extra conspicue alatus, alis 10-11 spiralliter sinuato-plicatis 2-3 mm. latis. *Petala* albo-lutea, brunneo-nervosa; 4 inferiora subaequalia, obovato-spathulata, ungue incluso 1.8-1.9 cm. longa, lamina 0.8-1 cm. lata extra pilis ferrugineis dense lanata intus glabra, ungue utrinque villosa 5-6 mm. longo; petalum quintum summum spathulato-oblongum, plicatum, 1.6 cm. longum, circiter 5 mm. latum. *Stamina* glaberrima, inaequalia, 0.5-1 cm. longa. *Ovarium* sessile, sulcatum, pilosum, 4 mm. longum, 2 mm. diametro, sensim in stylum basi excepta glabrum 4 mm. longum attenuatum. *Legumen* maturum planum, densissime rufo-tomentosum indumento senectute detersili, obovato-oblongum, 12-16 cm. longum, 4.4-4.8 cm. latum.

BRITISH GUIANA. Moraballi Creek, Essequibo River, in mora and morabukea forest, August 17th, 1929, *Sandwith* 44 (type): giant bush-rope, frequent; branchlets and lower surface of leaves cupreous; leaves entire; calyx crinkled, cupreous; petals cream, veined with brown, with cupreous hairs on back; young pods cupreous-tomentose. *Ibid.*, Sept. 19th, 1929, *Sandwith* 300, a collection of seedling plants and seedling leaves, common on the forest floor. Weriwera-Kuru Creek, Essequibo River, Oct. 14th, 1922, *Hohenkerk* in Forestry Department record no. 197B. Opposite Bartica, April 1887, *Jenman* 3627. Koorie Creek, Nov. 1886, *Jenman* 2690, "base of stem as stout as one's body." Upper Waini Trail, North-west District, Nov. 1910, *C. W. Anderson* in Forestry Department record no. 197A (seedling leaf only). "Mazaruni, Cuyuni and Essequibo," *Appun* 380 (seedling leaves). "Demerara," *Parker* (seedling leaves),

Creole names, "Monkey Ladder" or "Turtle Step."

Frequent by the Moraballi Creek, where the "ladders" formed by the mature rope were one of the most conspicuous features of the forest, but not nearly so plentiful as *B. Kunthiana* Vog. The seedling leaves are remarkably different in shape from those of the mature tree, which are usually quite entire, and would hardly be identified with them in herbaria in the absence of field-notes; the same is true of the seedling leaves of *B. Kunthiana*, which are cleft to the base.

B. Siqueiraei *Ducke* in Arch. Jard. Bot. Rio de Janeiro iii. 108 (1922); iv. 54 (1925).

Moraballi Creek, Essequibo River, Nov. 13th, 1929, *Sandwith* 603. Bush-rope in mixed forest, not forming a "monkey-ladder." Flowers in magnificent racemes. Petals creamy-white. Pedicels, calyx, and back of petals pale cupreous-sericeous.

Distr. Brazil (Pará).

The material agrees perfectly with *Ducke* 11104 from the Rio Xingú. A remarkably interesting extension of the range of an extraordinarily handsome and distinct species. It was evidently local in this district, as it was only noticed in a very small area along one of the lines which were cut at random by members of the Oxford Expedition.

Eperua (Wallaba) in British Guiana. The Wallabas of the Colony are of such growing economic importance,* and of such interest to the ecologist studying the various types of forest, that it seems desirable to give a simple key to the species and an enumeration of the different collections of each. The best characters are furnished by the inflorescence, the leaflets of each species being extremely variable in shape, size and number. Four of the five species found in the Colony appear to occur more or less plentifully together in the Wallaba consociation or forest-type, and at least three of these are passing under two Arawak vernaculars, Soft Wallaba and Ituri Wallaba. Their presence side by side is proved by the results of the Wallaba plot which was worked by the botanists of the Oxford Expedition. In this area, besides the dominant *E. falcata* or Soft Wallaba, material was collected from two Ituri Wallabas, growing within a few yards of each other, which was not distinguished in the field, but has been found on return to Kew to represent two described species which are apparently separable in the herbarium. The fifth species, *E. Schomburgkiana*, is easily distinguished from the other four by its snow-white petal, and appears to be confined to the banks of rivers and creeks, where it is very plentiful.

Inflorescence very long (usually several feet) and pendulous :

Inflorescence covered with a dense, rust-coloured, scurfy wool.....

1. *rubiginosa*.

Inflorescence covered with finely adpressed ashy-sericeous or ashy-brown hairs.....2. *falcata*.

Inflorescence very short, not pendulous :

Inflorescence covered with a dense, conspicuous, pale brown, scurfy wool : petal white.....3. *Schomburgkiana*.

Inflorescence very finely hirtellous ; petal rhododendron-mauve (Ituri Wallabas) :

Stipules small and inconspicuous, 2-5 mm. long, up to 3 mm. broad ; bracteoles inserted close to the calyx, normally above the middle of the pedicel ; petal rather small, rarely up to 5 cm. long.....4. *grandiflora*.

Stipules large and conspicuous, usually 0.7-2 cm. long and up to 1.5 cm. broad ; bracteoles distant from the calyx, normally below the middle of the pedicel or at its base ; petal large, 4.5-8.5 cm. long (usually 6-8 cm.)...5. *Jenmani*.

*See a paper entitled "The Wallabas of British Guiana," by J. B. Aitken, in *Tropical Woods*, no. 23, 1-5 (1930).

1. **E. rubiginosa** *Miq.* Stirp. Surinam. Sel. 12 (1850).

Essequibo and Rupununi Rivers, 1838, *Robert Schomburgk* 515 ; ann. 1841, *Richard Schomburgk* 174 ; Essequibo River, 1881, *Jenman* 1147 ; Kurupukari, Essequibo River, July 1920, *Hohenkerk* in F.D. no. 122B ; Essequibo and Mazaruni Rivers, *Appun* 294 ; Mazaruni River, 1880, *Jenman* 768, 786.

Distr. Surinam and French Guiana.

Not collected on the Moraballi Creek by the Oxford Expedition.

2. **E. falcata** *Aubl.* Hist. Pl. Guiane, 369, t. 142 (1775).

Corentyne River, 1879, *Jenman* 234 and *im Thurn* ; ann. 1918, *Leechman* ; Demerara River, 1888, *Jenman* 4941 ; Upper Demerara River, 1887, *Jenman* 4095 ; Moraballi Creek, Essequibo River, 1929, *Sandwith* 137, 329 ; Morebo, Barima River, North-west District, 1908, *C. W. Anderson* 122.

Vernacular name (Arawak), Soft Wallaba.

Distr. Surinam and French Guiana (*Aublet* !) ; extreme north of the state of Pará, Brazil. Cultivated in Trinidad.

The flowers vary in colour from deep rose to greenish-white.

3. **E. Schomburgkiana** *Benth.* in Mart. Fl. Bras. xv. pars ii. 226 (1870) ; verosimiliter non Pittier in Trab. Mus. Com. Venezuela, iii. 172 (1928).

Orealla, Corentyne River, 1879, *Jenman* 459 ; Essequibo and Rupununi Rivers, 1838, *Robert Schomburgk* 317, 517 ; Essequibo River, *Appun* 384, *Jenman* 1336 ; Moraballi Creek, Essequibo River, 1929, *Sandwith* 142 ; above Arrawarri Mouth, Lower Essequibo River, 1909, *C. W. Anderson* 182 ; Potaro River, Tumatumari, 1921, *Gleason* 332 ; Mazaruni River, *Jenman* 627, 5257, *Appun* 359.

Distr. Rio Trombetas, Brazil.

From the evidence of field-notes, this very distinct species would appear to be absent from the " wallaba forest " of sandy ridges away from the banks of creeks and rivers. As with other species, individuals vary considerably in height.

4. **E. grandiflora** (*Aubl.*) *Benth. l.c.*—*Parivoa grandiflora* *Aubl. l.c.* 757, t. 303 (1775). ? *E. Schomburgkiana* Pittier in Trab. Mus. Com. Venezuela, iii. 172 (1928), non *Benth. E. Hohenkerkii* Sprague ms. ; Aitken in Tropical Woods, no. 23, 1 (1930), nomen.

Ann. 1844, *Richard Schomburgk* 988 (1722) ; Demerara River, *Jenman* 6269, 7304 ; Berbice River, May 1919, *Hohenkerk* in F.D. no. 788 ; opposite Bartica Grove, 1886, *Jenman* 2482 ; Moraballi Creek, Essequibo River, 1929, *Sandwith* 314 ; Upper Rupununi River near Dadanawa, 1922, *la Cruz* 1704.

Vernacular name (Arawak), Ituri Wallaba.

Distr. Surinam and French Guiana (*Aublet* !).

5. **E. Jenmani** *Oliv.* in Hook. Ic. Pl. 1955 (1891).

Bartica, 1888, *Jenman* 4770 ; Essequibo River, 1884, *Jenman* 2154 ; Moraballi Creek, Essequibo River, with *E. grandiflora*, 1929,

Sandwith 710; Rockstone, 1921, *Gleason* 837; Butukari, 1921, *Gleason* 718; Demerara River, *Jenman* 573, 3830, 4258; below the Kaiteur, Potaro River, 1881, *Jenman* 975; Kaburi River, Mazaruni River, 1926, *Wood* in F.D. no. 876; Kumaka, Kurupung River, Mazaruni River, 1925, *Altson* 313; *Appun* 756; ann. 1907, *F. C. Foote*.

Vernacular name (Arawak), Ituri Wallaba.

Distr. Surinam (no specimens seen) and French Guiana (*Martin* in *Herb. Mus. Brit.*). Cultivated in Trinidad and Jamaica, and at Singapore.

Careful study of the large series of specimens of *E. grandiflora* and *E. Jenmani* suggests that the validity of the characters separating them is still rather doubtful. It will be seen from the key that a definite overlapping has been discovered in the dimensions of certain parts. In addition to the characters given in the key, *E. Jenmani* normally differs from *E. grandiflora* in having longer pedicels and larger leaflets, but these characters cannot be used as invariable distinctions. The point of this note is, in fact, to suggest that forest officers should study these two Ituri Wallabas in the field with a view to determining their final taxonomic relationship.

***Peltogyne pubescens* Benth.** in *Hook. Journ. Bot.* ii. 96 (1840).

Moraballi Creek, Essequibo River, Nov. 1st, 1929, *Sandwith* 546. Tall tree, 132 ft. high, 24 in. diam., on hill in wallaba forest. Bark reddish-brown; sapwood cream; heartwood dark brown, purple on exposure. Inflorescence very beautiful on the lax crown; buds pruinose; sepals 4 and petals 5, pink; filaments white; style pink, stigma purplish; ovary whitish-sericeous.

Vernacular names, Kuroburelli (Arawak); Purpleheart.

Distr. British Guiana; Brazil (Rio Branco, *Ule* 7728, 8151); Colombia.

Differs from *P. paniculata* Benth. of the Rio Negro and Casiquiare in the shape and size of the leaflets, and in the indumentum of the inflorescence.

***Hymenaea Davisii* Sandwith**, sp. nov.; ovario tomentoso, *H. oblongifoliae* Huber affinis, foliolis angustioribus falcatis magis acuminatis, floribus longius pedicellatis, stipite calycis supra bracteolas multo longiore, tubo calycis longiore cupulari differt; ab *H. intermedia* Ducke ovario tomentoso statim distinguenda.

Arbor excelsa, 34.5 m. alta, 62.5 cm. diametro, in eperuetis crescens, cortice sublaevi rubro-brunneo. *Petiolus* glaber, teres, circiter 2 cm. longus; *petioluli* glabri, 3-4 mm. longi. *Foliola* bina, elliptico-lanceolata, longa ac angusta, semper distincte falcata, apice conspicue vulgo ad 1 cm. acuminata, basi inaequilaterali obliqua cuneata, 11-15 cm. longa, 3-4.2 cm. lata, coriacea, utrinque nitida, glaberrima, nervis omnibus supra impressis, subtus costa prominente nervis primariis elevatis sed haud valde conspicuis, ceteris utrinque vix cernendis. *Inflorescentia* paniculata, tota

indumento pallide brunneo dense adpresse pilosa, ad 15 cm. longa ; rami inferiores compositi, ceteri simpliciter racemosi post florum lapsum ad 3 cm. longi. *Bracteae* bracteolaeque delapsae. *Pedicelli* 5-7 mm. longi, ad 2 mm. lati, mox disarticulati, dense adpresse pilosi. *Flores* nocturni, fragrant. *Calyx* extra indumento simili indutus ; tubus discifer cupularis, 5-7 mm. longus, circiter 5 mm. latus, stipite insigni sub flore aperto 0.7-1 cm. longo ; lobi 1-1.3 cm. longi, 6-9 mm. lati, elliptico-oblongi, intus pilis longioribus laxe adpressis flavescentibus nitenti-sericei. *Petala* alba, oblongo-lanceolata vell lanceolata, glabra, conspicue punctato-glandulosa, 1.3-1.5 cm. longa, 5-6 mm. lata. *Stamina* filamentis albis glabris, 2-2.3 cm. longis ; antherae pallide citrinae, 4-5 mm. longae. *Ovarium* subquadratum, dense flavescenti-pilosum, 4-5 mm. longum, ad 3 mm. latum, stipite sub ovario ipso piloso 5-6 mm. longo (parte in calycis tubo immersa inclusa) ; stylus glaber, 2-2.5 cm. longus, stigmatibus circiter 1 mm. diametro ; ovula in unico ovario dissecto 6. *Legumen* rotundato-ovatum, monospermum, granulosum, minutissime tomentellum, senectute glabrescens, 4-4.5 cm. longum, 3.5 cm. latum.

BRITISH GUIANA. Warimia Creek, Essequibo River, June 8th, 1929, *Forestry Department* record no. 943 (type). "Large tree, 115 ft. high, 25 in. diam., in wallaba forest on white sand on top of hill slope ; not buttressed ; bark fairly smooth, reddish-brown ; gives locust gum when dead. Flowers nocturnal, dying next morning, very delicately fragrant. Calyx brownish. Petals and filaments white ; anthers pale lemon. This is a variety of Simiri which produces a small one-seeded pod."—*T. A. W. Davis*.

Macouria River, Essequibo River, March 9th, 1909, *C. W. Anderson* 165 (leaflets and pod). "Sapwood hard, pinkish-white. Heartwood fair-sized, hard, rich-brown, darkening on exposure."

Vernacular names ; Locust, Simiri or Courabarie.

This fine tree is named in honour of Mr. T. A. W. Davis, Assistant Conservator of Forests, British Guiana, whose observations on the forest flora of this Colony are of the highest importance. The other "Simiri" or "Locust" of British Guiana, *H. Courbaril* L., is immediately distinguished from this species by the shorter, relatively broader leaflets, the glabrous ovary and the longer pod.

Dimorphandra Gonggrijpii *Kleinh.* in *Rec. Trav. Bot. Néerl.* xxii. 410 (1925).

Moraballi Creek, Essequibo River, Nov. 8th, 1929, *Sandwith* 570 (foliage only).

Vernacular name (Arawak), Morabukea.

Distr. British Guiana, Surinam.

The identity of this well-known tree is at last fixed with certainty by comparison with the type material which was borrowed from Utrecht. It is one of the largest and commonest trees in the north of the colony, reaching a height of 150 feet, and forming a clearly distinguishable consociation or forest-type. The latter will be discussed at length in an ecological paper by Messrs. T. A. W.

Davis and P. W. Richards. At the moment it may be pointed out that *Morabukea* is abundantly distinct from *Mora* (*Mora excelsa* Benth.) in its thinner trunk with rich brown (not greyish) bark and smaller flange buttresses; and in the shape and venation of its bijugous leaflets. The measurements of the latter were unfortunately omitted by Kleinhoonte; they are 5–15 cm. in length, and 2.5–7.5 cm. in width. The flowers have not yet been collected or described, so that it is perhaps inadvisable at present to transfer the species to the genus *Mora* as recently defined by Ducke (Arch. Jard. Bot. Rio de Janeiro iv. 44), although it is highly probable that this transference will be required.

***Pithecellobium pedicellare* (DC.) Benth.** in Hook. London Journ. Bot. iii. 219 (1844).—*Inga pedicellaris* DC. Prodr. ii. 2. 441 (1825).

Moraballi Creek, Essequibo River, Sept.-Oct. 1929, *Sandwith* 350, 469. A large tree with rich brown, lenticellate bark. Calyx greenish-brown. Corolla red; filaments pure white. No. 469 was a tree 131 ft. 9 in. high and 3 ft. 2 in. diam.

Vernacular name (Arawak), Red Manariballi.

Dist. Surinam, French Guiana and Brazil. Apparently the first record from British Guiana.

***Inga* (§ *Leptinga*) *Jenmani* Sandwith**, sp. nov.; *I. sertuliferae* DC. affinis, foliolis multo minoribus tenuioribus chartaceis facie undulata, pedunculis semper multo (saepius duplo) brevioribus, calycibus minoribus differt.

Frutex vel *arbor*, 3–30 m. alta, ramulis summis fuscis pubescentibus dense lenticellatis. *Folia* petiolo 0.5–1.5 cm. longo, internodiis rhacheos 1–2.8 cm. longis; petiolus rhachisque pubescens sed vetustate glabrata, vix unquam lenticellata, angustissime alata marginibus erectis, vulgo 1 mm. lata sed sub jugo inferiore ad 2 mm. lata; glandulae nunc sessiles nunc distincte stipitatae; foliola 1–3-juga, vulgo 2-juga, elliptica vel ovato-elliptica, apice breviter obtuse acuminata, basi in petiolulum brevissimum 1–2 mm. longum abrupte cuneatim attenuata, inferiora 3.5–8 cm. longa, 1.5–3.5 cm. lata, foliola jugi terminalis 7–11.5 cm. longa, 2.5–5.7 cm. lata, glabra, nitida, chartacea, facie undulata, supra nervis omnibus impressis obscuris, subtus omnibus elevatis valde intricate reticulatis, nervis primariis utroque costae latere sursum arcuantibus vulgo 6–8; stipulae delapsae. *Umbella* pedunculo striato dense minute pubescente, 0.3–3.2 cm. (saepius 1–2 cm.) longo ad 1 mm. lato; bractae ovatae, ferrugineo-pubescentes, 1–1.5 mm. longae, circiter 0.75 mm. latae; pedicelli striati, glabri vel sparse pilosuli, adulti 0.7–1.3 cm. longi. *Flores* albi. *Calycis* tubus sparse ferrugineo-pubescentis, ad 2 mm. longus (saepe brevior), 1 mm. latus; dentes extra dense ferrugineo-pubescentes, 0.3–0.5 mm. longi, ad 0.7 mm. lati. *Corollae* tubus glaber, 6–8 mm. longus, apice ad 2 mm. latus; lobi extra praesertim dimidio superiore plus minusve ferrugineo-pubescentes, ad 1.75 mm. longi, circiter 1 mm. lati. *Tubus stamineus*

vix vel ad 3 mm. exsertus; filamenta libera ad 1.3 cm. longa. *Fructus* non visus.

BRITISH GUIANA. Moraballi Creek, Essequibo River, Sept. 7th, 1929, *Sandwith* 187 (type); tree about 90 ft. high. *Ibid.*, Sept. 3rd, 1929, *Sandwith* 171. Supenaam Creek, Essequibo River, June 1893, *Jenman* 6587. Demerara River, May 1887, *Jenman* 3908. Without locality, 1844, *Schomburgk* 810, identified by Benthams as "*sertulifera* DC. var." Upper Mazaruni River, Sept.-Oct. 1922, *la Cruz* 2245, noted as 11 ft. high.

Closely allied to *I. sertulifera*, but the distinguishing characters are maintained in large series of both species, and are evidently not affected by the height of the tree, which varies considerably, nor by its habitat in dark forest or on the sunny banks of creeks and rivers.

I. Huberi *Ducke* in Arch. Jard. Bot. Rio de Janeiro iii. 49 (1922); v. 120 (1930).

Moraballi Creek, Essequibo River, Aug. 26th, 1929, *Sandwith* 119: middle-sized tree, about 70 ft. high, in "low bush"; bark reddish-brown, fluted; flowers white, capitate. *Ibid.*, Oct. 26th, 1929, *Sandwith* 526: tree about 50 ft. high, in mixed forest; leaflets shining-green and glabrous; calyx and corolla pale green; filaments white.

Vernacular name (Arawak), Warakusa; but this is indiscriminately applied to many species of *Inga*.

Distr. Brazil (Pará).

First record from British Guiana, and no other specimens from the Colony have been seen. Compared with *Ducke* 20120.

I. rubiginosa (*Rich.*) DC. Prodr. ii. 434 (1825); Benth. in Trans. Linn. Soc. xxx. 627 (1875).—*Mimosa rubiginosa* Rich. in Act. Soc. Hist. Nat. Par. 1792, 113.

Moraballi Creek, Essequibo River, Nov. 5th, 1929, *Sandwith* 556: tall tree, 94 ft. high, 12 in. diam., in mixed forest; inflorescence and lower surface of leaflets dark fulvous-tomentose; buds shining fulvous-sericeous; stamens and style pure white. *Ibid.*, Nov. 13th, 1929, *Sandwith* 605; middle-sized tree, about 60 ft. high, in mixed forest.

Vernacular name (Arawak), Karoto.

Distr. Guiana, Brazil (Pará). *Ducke* 10079, recently distributed as *I. Thibaudiana* var. *latifolia* Huber, agrees excellently with the Cayenne specimen (*Martin*) in Herb. Kew., which was cited as *I. rubiginosa* by Benthams.

ROSACEAE.

All the species collected by the Oxford University Expedition in 1929 are included.

Licania buxifolia *Sandwith* sp. nov.; *L. canescenti* R. Benoist affinis, foliis maturis crassioribus, plerumque bullatis marginibus

valde revolutis, mucronatis tantum vel brevissime cuspidatis, ramis inflorescentiae magis glabris, floribus majoribus differt.

Arbor excelsa, in eperuetis crescens; ramuli summi glabri lenticellati. *Folia* elliptica vel elliptico-ovata, apice saepe facie rotundata obtusa sed semper acuta vel mucronata, mucrone revoluta, vel brevissime (2-4 mm.) cuspidata, basi cuneata, 2.5-13 cm. longa, 1.5-6.2 cm. lata, inter inflorescentias parva atque conferta, supra glabra, subtus ut in *L. canescente* nervis exceptis incana oculo nudo glabra sed tomento minutissimo arcte adpresso farinaceo oblecta, novella nonnunquam plana chartacea, adulta (praesertim prope inflorescentias) crasse coriacea bullata buxiformia marginibus valde insigne revolutis, nervis supra impressis reticulatione vix cernenda, subtus prominentibus rete venularum impresso vel in foliis majoribus prominente, nervis primariis utroque costae latere 6-10 arcuantibus; petiolus glaber, 2-6 mm. longus; stipulae subulatae, mox delapsae. *Inflorescentiae* numerosissimae, axillares atque pseudoterminales, 5-15 cm. longae; rami saepe bracteis foliaceis foliis summis bullatis revolutis simillimis suffulti, maturi purpurascens, glabri vel glabrescentes; cymae pauciflorae, breviter (0.5-2 mm.) pedunculatae, pedunculo tomentello; bractae basi pedunculorum glabrae vel glabrescentes, triangulares, circiter 0.5 mm. longae. *Flores* parvi, albo-lutescentes. *Calyx* subgloboso-campanulatus, extra ac intus subtiliter dense griseo-tomentellus, cum lobis ad 2 mm. longus, vix ad 1.5 mm. diametro; lobi triangulares, vix ad 1 mm. longi, 1 mm. lati. *Petala* nulla. *Ovarium* dense tomentosum, circiter ad 1.2 mm. altum atque diametro. *Fructus* non visus.

BRITISH GUIANA. Moraballi Creek, Essequibo River, Sept. 23rd, 1929, *Sandwith* 327 (type): tall tree, 84 ft. high, in wallaba forest on sandy ridge, a characteristic member of this type of forest; crown very dense; fl. cream. Upper Demerara River, Sept. 1887, *Jenman* 4110.

Vernacular name (Arawak), Marishiballi.

Certainly closely allied to *L. canescens* R. Benoist, but easily distinguished on foliage characters from the numerous sheets of that species in the Paris Herbarium and in London.

L. heteromorpha *Benth.* in Hook. Journ. Bot. ii. 221 (1840).

Moraballi Creek, Essequibo River, Nov. 13th, 1929, *Sandwith* 604. Tall tree in mixed forest. Fl. dirty cream. Very like Kairiballi, but leaves thicker, smaller and more emarginate. Fruit as in Kairiballi.

Vernacular name (Arawak), Kunoko.

Distr. Guiana, Amazonian Brazil.

As pointed out by Fritsch (Ann. Hofm. Wien, iv. 44), this is an extraordinarily variable species, particularly in the size, shape and apex of the leaves, which do not yield satisfactory characters for specific division. There is, however, one form which is so frequent and is so easily distinguished by the much less intricate and more open reticulation of the leaves, that it seems worthy of varietal rank. It

was sorted out as a distinct species by the younger Hooker, who gave it the manuscript name *L. Klotzschii* Hook. fil.; and Fritsch, in discussing and noting the characteristics of *Schomburgk* 824, remarks that at first he thought it represented a new species, but concludes that the distinctions are due to the specimen having been collected from a sterile branch. This conclusion is not borne out by subsequent collections of the same plant, but the only constant character appears to be that of the leaf-venation. The Arawaks who accompanied the Oxford Expedition distinguished this tree from Kunoko under the name Kairiballi, but this name was also given to *C. W. Anderson* 39, the herbarium material of which agrees with Kunoko. The variety may be described as follows:—

***Licania heteromorpha* Benth.** var. ***perplexans* Sandwith**, var. nov.; foliis utrinque satis laxe nec intricatissime reticulatis differt.

BRITISH GUIANA. Ann. 1844, *Schomburgk* 824 (1443B); type; Pomeroun River, Sept. 1843, *Schomburgk* 1443; Demerara River, May 1887, *Jenman* 3902; *ibid.*, March 1898, *Jenman* 7336; Kamwatta Creek, Koirimap River, Pomeroun River, June 1918, *Hohenkerk* in Forestry Department record no. 39 B; Moraballi Creek, Essequibo River, August 28th, 1929, *Sandwith* 140; *ibid.*, Oct. 12th, 1929, *Sandwith* 433.—No. 140 was a tall tree 111 ft. high, in morabukea-greenheart forest; and no. 433 was a tree 92 ft. high and 8 in. diam., in mixed forest.

FRENCH GUIANA. *Martin*.

Vernacular name (Arawak), Kairiballi.

***L. divaricata* Benth.** in Hook. Journ. Bot. ii. 221 (1840).—*L. heteromorpha* var. *divaricata* Fritsch in Ann. Hofm. Wien, iv. 45 (1889).

This species differs very widely from *L. heteromorpha* and its varieties, not merely in the venation of the leaves but especially in the colour, size and indumentum of the calyx, and the size and shape of the primary bracts, which give the inflorescence a totally different facies. Material exactly agreeing with the type (*Schomburgk* 463) was collected on the Mora-mora-bisi Creek, Mapenna River, Corentyne River, in April 1918, by *L. S. Hohenkerk* in Forestry Department record no. 705. The tree was noted as possessing deep blood-red bark with similar gummy sap, and very small, greenish-yellow flowers.

Vernacular name, Buruburuli.

***L. densiflora* Kleinh.** in Rec. Trav. Bot. Néerl. xxii. 383 (1925).

Moraballi Creek, Essequibo River, Sept. 24th, 1929, *Sandwith* 336: tall tree, 108 ft. high, in morabukea forest; leaves ashy-white below; fl. creamy-brown; fruiting, and with a few fresh inflorescences. *Ibid.*, Sept. 26th, 1929, *Sandwith* 341: tall tree, 113 ft. high, on slope in mora-morabukea forest; in good young flowering condition.

Vernacular name (Arawak), Marishiballi.

Distr. Surinam.

Compared with authentic material (*Pulle* 452 and *Gonggrijp* 5346) borrowed from Utrecht. Other British Guiana collections are *Jenman* 623, Mazaruni River, Sept. 1880; *Jenman* 3604, Bartica, April 1887; and *C. W. Anderson* 57, Yarikita River, Amakura River, North-west District, July 1908.

***L. venosa* Rusby**, New Sp. S. Am. Pl. 26 (1920).

Moraballi Creek, Essequibo River, Sept. 14th, 1929, *Sandwith* 261; tall tree in morabukea forest. *Ibid.*, in mixed forest, Sept. 19th, 1929, *Sandwith* 299; tall tree with leaves ashy beneath, and creamy-yellow flowers.

Vernacular name (Arawak), Kautaballi.

Distr. Guiana, Eastern Venezuela.

One of the commonest and most easily recognised trees in the district, being especially plentiful in mixed forest. Its affinity is with *L. Hostmanni* Fritsch and *L. majuscula* Sagot. Other British Guiana specimens agreeing with Rusby's type collection are *Jenman* 3839, Demerara River, April 1887; *Jenman* 4112, Upper Demerara River, Sept. 1887; *Jenman* 2393, Macouria River, Essequibo River, Nov. 1886; *la Cruz* 4349, Assakatta, North-west District, Sept. 1923; *la Cruz* 4384, Kaieteur Falls, Potaro River, Oct.-Nov. 1923; and *Forestry Department* record no. 887, Mazaruni River, Aug. 1926.

***L. laxiflora* Fritsch** in Ann. Hofm. Wien, iv. 46 (1889).—*L. macrophylla* Klotzsch in Schomb. Faun. et Fl. Gui. 1198 (1848), nomen.

Moraballi Creek, Essequibo River, Nov. 9th, 1929, *Sandwith* 586: middle-sized to tall tree, in mixed forest; leaves greyish-tomentose below; infl. with brownish hairs; fl. cream. *Ibid.*, Oct. 26th, 1929, in mixed forest, *Sandwith* 711 (leaves only).

Vernacular name (Arawak), Kauta.

This has been compared with *Robert Schomburgk* 1559 (from "savanne, Brit. Guiana, Dec. 1843") and 24 ("last small collection") in Herb. Kew., which agree with Fritsch's description and with specimens of the type collection (*Schomburgk* 976) in the Paris Herbarium, and seem to belong to the same gathering. The inflorescence of the Moraballi Creek collection is stiffer and more densely flowered than that of Schomburgk's specimens, which seem to have been untypical, and collected from an old branch with large, old leaves. This species seems to be far more closely related to *L. mollis* Benth. than to *L. leptostachya* Benth., with which it was compared by Fritsch; it is distinguished from *L. mollis* by the leaves, which are cuneate-attenuate at the base instead of cordate or rounded, by the longer petiole, and by the secondary veins which are regularly subhorizontal and parallel, whereas in *L. mollis* they are very irregular.

***L. incana* Aubl.** Hist. Pl. Guiane, 119, t. 45 (1775).

This species was identified by Bentham with the plant which was distributed by Sagot as *L. microphylla* Sagot, and which was

named *L. Kunthiana* by Sir Joseph Hooker in his account in the Flora Brasiliensis. Hooker himself referred Aublet's species to Bentham's *L. leptostachya*. In 1889 Fritsch adopted Bentham's conclusion in his review of the genus in Ann. Hofm. Wien, iv. 48, but there is no evidence that either he, or Bentham, or Hooker had ever seen Aublet's specimen. A wiser course was followed by R. Benoist in his conspectus of the *Licaniae* of French Guiana in Bull. Mus. Par. xxv. 512 (1919). Having failed to find Aublet's specimen in Paris, and regarding the original description and figure as inadequate and partly erroneous, he refused to identify *L. incana* with any known species. Fortunately, the specimen exists in the Herbarium of the British Museum, and it agrees neither with *L. Kunthiana* nor with *L. leptostachya*, but with the very distinct thick-leaved plant which Bentham described as *L. crassifolia*, and which occurs on savannahs throughout Guiana. This was reduced by Benoist (l.c. 514-15) to varietal rank under *L. leptostachya* Bth., with the remark that the characters separating *L. leptostachya*, *L. crassifolia*, and *L. axilliflora* Hochr. were not of specific value. This supposition will have to be tested by careful observations in the field. Meanwhile it may be added that the life-size figure of the leaf given by Aublet is larger than any of the leaves on his dried specimen, which show none of the conspicuous minor venation of this figure, a character which would immediately suggest *L. leptostachya* as contrasted with *L. crassifolia*. At present, however, the evidence of the dried specimen in Herb. Mus. Brit. is the strongest available for fixing the identity of Aublet's plant.

Distr. Guiana.

The following species of *Licania* have been found to agree with authentic material of earlier described species:—

L. longifolia R. Benoist in Bull. Mus. Hist. Nat. Paris, xxviii. 252 (1922) is **L. venosa** Rusby, New Sp. S. Am. Pl. 26 (1920).

Material in Herb. Mus. Brit. collected by Mélinon and distributed from Paris as *L. longifolia* agrees with Rusby's type collection of *L. venosa* and with specimens from British Guiana.

L. galibica R. Benoist in Bull. Mus. Hist. Nat. Paris, xxv. 514 (1919) is **L. membranacea** Sagot ex Laness. Pl. util. Colon. Franç. 130 (1886).

Benoist omits to mention *L. membranacea* in his paper (loc. cit.) on the *Licaniae* of French Guiana. Sagot's no. 1081, which is one of the two collections cited by Benoist and distributed from Paris as *L. galibica*, was distributed to Kew long ago as *L. membranacea* Sagot, and no doubt represents the species which was later validly, although most inadequately, published by Lanessan.

L. pachystachya Kleinh. in Rec. Trav. Bot. Néerl. xxii. 384 (1925) is **L. robusta** Sagot in Ann. Sci. Nat. sér. 6, xv. 306 (1883).

Mélinon material recently distributed from Paris as *L. robusta* is probably syntypic and agrees with Sagot's rather short description.

Herb. Boschwezen no. 2729, a collection in the Utrecht Herbarium which was made from one of the authentic trees of *L. pachystachya*, cannot be distinguished from Mélinon's specimens.

***L. crassifolia* Benth.** in Hook. Journ. Bot. ii. 220 (1840) is ***L. incana* Aubl.**, vide supra.

***Parinari parvifolia* Sandwith** sp. nov.; *P. montanae* Aubl. atque *P. Pajura* R. Benoist affinis, ab ambabus statim foliis parvis, praeterea ab illa indumento ramulorum petiolorum inflorescentiaeque, ab hac floribus minoribus differt.

Arbor excelsa, 30–45 m. alta, 75.5 cm. diametro, vertice lato densissime ramoso. *Ramuli* lenticellati, cortice brunneo vel pullo, seniores glabri vel glabrescentes, summi densissimi atque crebre foliati, novelli dense villosi atque tomentelli, pilis adscendentibus subadpressis vel patulis siccitate cinereis pullis vel fere fulvis necnon tomento subtus pilis induti, indumento toto saepe mox deciduo. *Folia* parva, ovata vel saepius lanceolato-elliptica, apice sensim in acumen conspicuum vulgo 1–1.3 cm. longum attenuata, basi attenuata cuneata raro obtusa subrotundata, 3–7.5 cm. longa, 1–3 cm. lata, rigide coriacea, supra glabra costa impressa nonnunquam pilosa excepta nitidula siccitate olivacea vel saepius brunnea nervis impressis, subtus cinerea vel siccitate cinereo-fulva lana densa brevissima arcte adpressa senectute e nervis venulisque evanescente induta, costa etiam juventute adpresse pilosa, valde crebre reticulata venulis parallelis, nervis primariis numerosissimis utroque costae latere vulgo circiter 30 a se 2–4 mm. distantibus parallelis patulis versus marginem valde arcuatis; petiolus brevis, 2–5 mm. longus, villosus vel senectute glaber; stipulae non visae. *Inflorescentiae* apice ramulorum in axillis foliorum summorum vel terminales 1–5 fasciculatae, thyrsoidae, 3–5.5 cm. longae, totae tomento cinereo atque pilis cinereis adscendentibus vel patulis indutae; bracteolae cymarum magnae, conspicuae, alabastra amplexantes, concavae, ovatae, acuminatae, 5–6 mm. longae, 3 mm. latae, extra indumento piloso atque tomentello supra descripto praeditae intus tomentellae; bracteolae florales ultimae 3.5 mm. longae, 2.5 mm. latae; pedicelli laterales brevissimi, floris intermediis circiter 2 mm. longi. *Flores* albo-virides. *Calyx* extra indumento simili indutus; tubus anguste obconico-campanulatus, 3–3.5 mm. longus, ad 3 mm. latus, intus densissime longe pallide fulvo-villosus; lobi ovato-lanceolati, acuminati, 2.5 mm. longi, 1.5 mm. lati. *Petala* 5, oblongo-spathulata, 2 mm. longa, ad 0.8 mm. lata, dimidio superiore sub lente forti minute pilosula. *Stamina* ut videtur 7, filamentis glabris 2 mm. longis. *Ovarium* densissime villosum, 1.2 mm. longum, vix 1 mm. latum; stylus inferne villosus, superne glaber, 2.5–3 mm. longus. *Fructus* ignotus.

BRITISH GUIANA. In mixed forest at the Moraballi-Wineperu Divide, Essequibo River, Aug. 28th, 1929, *Sandwith* 139 (type). Tall tree, 129 ft. high, 2½ ft. diam., with a very wide, dense,

floriferous crown. Leaves ashy beneath. Flowers whitish-green. Branchlets colonised by ants.

Upper Demerara River, Sept. 1887, *Jenman* 3992. "A large tree, 100 ft. or more high."

Vernacular name (Arawak), Hill Bahurada. Recognised by *Jenman* as a distinct species from the Broad-leaved Bahurada (*P. campestris* Aubl.) in a note forwarded to Kew in March, 1888.

This magnificent species, remarkable for its uniformly small leaves, lacks the long, dark brown, woolly indumentum which is characteristic of the branchlets, petioles, and inflorescence of *P. montana*. The leaves resemble more those of *P. Glazioviana* Warm. and *P. brachystachya* Benth., the former of which has longer petioles and much less acuminate leaves, while the latter is a small tree with thin papery leaves; both have fewer lateral nerves and much narrower, less conspicuous, bracteoles.

P. montana Aubl. Hist. Pl. Guiane, 514, tt. 204-5 (1775).—*P. Rodolphi* Huber in Bol. Mus. Pará, vi. 77 (1910); Ducke in Arch. Jard. Bot. Rio de Janeiro iii. 44 (1922).

Comparison with Aublet's specimen in the British Museum Herbarium shows that R. Benoist was correct in his identification of *P. Rodolphi* with *P. montana*, and in describing the species referred by Huber and Ducke to *P. montana* as *P. Pajura* R. Benoist: see Bull. Mus. Par. xxviii. 252-3 (1922). Herb. Jard. Bot. Rio no. 15025, distributed as *P. Rodolphi*, is *P. montana* Aubl., and nos. 15028 and 18225, distributed as *P. montana*, agree with the type no. (*Huber* 7045) of *P. Pajura* R. Benoist in Herb. Mus. Brit.

P. campestris Aubl. Hist. Pl. Guiane, 517, t. 206 (1775).

Moraballi Creek, Essequibo River, Sept. 7th, *Sandwith* 184. Tall tree, 119 ft. high, 2 ft. diam., 82 ft. to the first fork, in mixed forest. Buttressed up to 13 ft. Leaves ashy below. Petals white, erect.

Vernacular name (Arawak), Broad-leaved or Round-leaved Bahurada.

Distr. Trinidad, Guiana, Brazil.

Easily recognised by the large, persistent, striate stipules and the cordate base of the leaves.

P. guyanensis *Fritsch* in Ann. Hofm. Wien, v. 14 (1890); see below, under *Hirtella guyanensis*.

P. Hostmanni *Fritsch*, l.c. 13, is **Couepia cognata** (Steud.) *Fritsch* in Ann. Hofm. Wien, iv. 60 (1889); Pulle, Enum. Pl. Surinam 198 (1906).—*Hirtella cognata* Steud. in Flora, xxvi. 761 (1843). *Couepia Steudeliana* Miq. Sel. Stirp. Surinam. 28 (1850). *Moquilea Steudeliana* Walp. Ann. ii. 463 (1851-2).

Fritsch overlooked the fact that his species had already been twice named from the same material (*Hostmann* 795); but, a year before, he had inadvertently made the necessary new combination

for it in its correct genus. This was missed by the Index Kewensis, but was taken up by Pulle, who omitted to cite Fritsch's later name in synonymy. The following specimens from British Guiana are in Herb. Kew.: *Jenman* 6301, from the Demerara River, Dec. 1891; and *la Cruz* 2107, from the Upper Mazaruni River, Sept.-Oct. 1922.

Couepia comosa *Benth.* in Hook. Journ. Bot. ii. 215 (1840).

Cuyuni River; on the rocky shore of islets near the right bank at the Akaio Falls, Nov. 25th, 1929, *Sandwith* 687. Low tree or shrub, up to about 15 ft. in height. Fl. white. Fr. greyish-black, spotted with brownish-white.

Distr. Apparently endemic on the larger rivers of British Guiana.

C. pauciflora *Huber* in Bol. Mus. Pará, v. 372 (1909).

Moraballi Creek, Essequibo River, Sept. 20th, 1929, *Sandwith* 315; middle-sized tree, 50-60 ft. high, in wallaba forest on hill. Other collections from the Colony are *Jenman* 4184, Upper Demerara River, Sept. 1887; and *Gleason* 539, lowland forest, Rockstone, July 1921.

Vernacular name (Arawak), Aiamoradan.

Distr. Pará.

The material agrees well with the type no. (*Ducke* 8630) in Herb. Mus. Brit. An interesting extension of the range of a most distinct species.

Hirtella americana *L.* Sp. Pl. ed. 1, 35 (1753), non Aubl., nec Jacq., nec Hook. fl. in Mart. Fl. Bras., nec Fritsch, nec Ducke, nec Standley in Contr. U.S. Nat. Herb. xxvii. 88 (1928), etc.

The specimen in Clifford's Herbarium in Herb. Mus. Brit., on which the description of this species in Hortus Cliffortianus p. 17 was based, proves to represent a plant from the Isle of Pines, Central America and the Spanish Main, which has for long been known either as *H. glandulosa* Spreng., or *H. mollicoma* H.B.K., or more recently as *H. guatemalensis* Standley. This of course bears no resemblance to Aublet's *H. americana*, which is *H. racemosa* Lam., and there is no reason either for the total elimination of the trivial *americana* (see Fritsch in Ann. Hofm. Wien, v. 10) or for its incorrect application. This discovery was first made by Mr. N. E. Brown in June, 1923. Mr. Brown considered that *Curtiss* 260, from near Nueva Gerona, Isla de Pinos, West Indies, Dec. 1903, was a very good match with Linnaeus' type; a comparison which was confirmed independently this year. An equally good match is *H. H. Smith* 850 from Santa Marta, Colombia. But there seems very little reason to doubt that all the specimens (*Triana*, *Linden*, *Lehmann*, etc.) distributed as *H. mollicoma* from Panamá and Colombia are referable to the same species, and that the British Honduras collections (e. g. *Schipp* 82) of *H. guatemalensis* Standley are equally inseparable from it. Kunth's description and figure of *H. mollicoma* agree well with these

plants; the Brazilian *H. glandulosa* Spreng. and its allies, on the other hand, differ widely from *H. americana*.

H. racemosa Lam. Encycl. iii. 133 (1789).—*H. americana* Aubl. Hist. Pl. Guiane 247, t. 98 (1775), non L.

Moraballi Creek, Essequibo River, Sept. 14th, 1929, *Sandwith* 253. Low tree on bank of creek. Petals pale veronica blue. Filaments deeper, like those of *Echium vulgare*.

Distr. Tropical America.

H. paniculata Sw. Prodr. Veg. Ind. Occ. 51 (1788).—*H. hirsuta* Lam. Illustr. ii. 114 (1793).

Moraballi Creek, Essequibo River, Sept. 18th, 1929, *Sandwith* 285. Low tree on bank of creek near its mouth. Petals pinkish-white. Filaments pinkish-purple in upper two thirds, whitish at base.

Distr. St. Vincent, Trinidad, Guiana and Rio Branco.

H. manigera Kleinh. in Rec. Trav. Bot. Néerl. xxii. 387 (1925).

Moraballi Creek, Essequibo River, Aug. 22nd, 1929, *Sandwith* 92: low tree, about 20 ft. high, in "low bush"; sepals olive; petals white; filaments pinkish-purple, but whitish towards the base. Other collections from the Colony are *Jenman* 3980, Upper Demerara River, Sept. 1887, noted as a small tree; and *Jenman* 5028, Demerara River, June 1889. Compared with the type in the Utrecht Herbarium.

Distr. Surinam.

H. guyanensis (Fritsch) *Sandwith*, comb. nov.—*Parinari guyanensis* Fritsch in Ann. Hofm. Wien, v. 14 (1890).

BRITISH GUIANA. Ann. 1841, *Schomburgk* 168 (type coll.). Bartica, Nov. 1888, *Jenman* 4734.

It is difficult to understand how Fritsch was induced to describe this and *Couepia cognata* in *Parinari*, since the facies of neither species suggests that genus. The present plant has a unilocular ovary, and its facies resembles that of some species of *Couepia*, to which genus it was referred by Sir Joseph Hooker under the manuscript name of *C. Schomburgkii*. The small number of its stamens (apparently 6-8), however, removes it from *Couepia* and requires its transference to *Hirtella*. Another manuscript note on Schomburgk's sheet records that this plant is *Waldeckia corymbosa* Klotzsch and Richard Schomburgk ms. in Herb. Mus. Berol.; this name is found on page 1249 in Klotzsch's alphabetical list of the Flora of British Guiana in the third (supplementary) volume of Richard Schomburgk's travels, but no reference is given to any page in the text, presumably owing to lack of information about the locality and habitat. The name is not found in the Index Kewensis.

The majority of the species here described are from a collection made in Central Africa, particularly in the volcanic region north of Lake Kivu, by Dr. D. H. Linder in 1927 on behalf of the Arnold Arboretum. The specimens were sent for determination to Kew by Dr. C. Schweinfurth, assistant to Prof. Oakes Ames. The collection, although not large, contains many interesting forms and the records considerably extend the distribution of some of the species. Others had only been collected once or twice previously.

The remainder of the new species in the paper are from various collections, mostly made in East Africa.

Diplacorchis ashantensis *Summerhayes*, sp. nov. ; a ceteris speciebus statura majore, floribus majoribus, petalis columnae haud adnatis, labello ambitu elliptico-obovato trilobato lobo intermedio lateralibus paulo brevioribus facile distinguenda.

Herba terrestris, erecta, usque 90 cm. alta. *Caulis* robustus, subteres, usque ad apicem dense foliatus. *Folia* inferiora vaginantia, obtusa, superiora late lanceolata, acuminata, basi attenuata, usque 11 cm. longa et 3 cm. lata, glabra, subtus insigniter trinervia, suprema sensim in bracteas transeuntia. *Racemus* circiter 25 cm. longus, dense multiflorus ; bracteae erecto-patentes, lineari-lanceolatae vel fere lineares, acutissimae, usque 5 cm. longae, flores multo superantes. *Flores* pro genere magni, erecto-patentes, pedicelli cum ovario usque 1.5 cm. longi, glabri. *Sepalum* intermedium lineari-oblongum, obtusum, 9–10 mm. longum, medio 2–2.5 mm. latum ; sepala lateralalia oblongo-lanceolata, subfalcata, basi valde obliqua, 10–11 mm. longa, supra basin 3–4 mm. lata, apice paulo incrassata subcucullata. *Petala* oblongo-lanceolata, leviter curvata, 11–12 mm. longa, infra medium 3.5–4 mm. lata, libera. *Labellum* ambitu elliptico-obovatum, basi attenuatum, apice trilobatum, lobis lateralibus obtusissimis extra rotundatis 1.5–2 mm. longis, intermedio paulo brevioribus anguste triangulari subacuto, totum labellum ab ostio calcaris 9–11 mm. longum, medio 7–8 mm. latum, basi carinis duabus altis basi columnae adnatis instructum ; calcar saccatum, obtusum, 3–4 mm. longum. *Columna* (anthera inclusa) 6.5 mm. longa ; anthera erecta, 3 mm. longa, obtusa, loculis approximatis parallelis, canalibus subnullis ; rostellum lobus intermedium erectus, valde compressus, cucullatus, lobi laterales brevissimi, horizontales, bursiculas semiglobosas viscidium includentes formantes ; stigma medio excavatum vel concavum.

GOLD COAST. Ashanti, Northern Province, Amoma, amongst the grass in savannah country, July 7th, 1913, *Chipp* 531 (type in Herb. Kew.). "Lip white, purple spotted."

This plant is of especial interest since it seems in some respects to be a link between the genera *Diplacorchis* and *Brachycorythis*. In the presence of small pouches in which the viscidium rest, and in the

*Continued from *K.B.* 1927, p. 419.

possession of two tall keel-like plates adnate to the sides of the base of the column and decurrent for a short distance on to the disc of the lip, the species falls into *Diplacorchis*. The habit, however, so much more robust than that of any *Diplacorchis* and resembling very strongly the section *Calocorythis* of *Brachycorythis*, and the lip, in which the side lobes are slightly longer than the triangular front lobe, seem to suggest an alliance with the latter genus. The bracts are, however, relatively longer in the present plant than in any species of *Brachycorythis*. In addition the spur is quite short and obtuse, another character intermediate between the two genera. The two high keels at the base of the lip in *Diplacorchis* can be seen on examination to be probably homologous with the prolonged decurrent margins of the hypochile in *Brachycorythis* and *Schwartzkopffia*, especially as they seem to terminate either gradually or abruptly in different species.

The present species differs markedly from the other species of *Diplacorchis* in having the petals entirely free from the column, a character of *Brachycorythis*, and consequently it seems desirable to create a separate section of *Diplacorchis* to contain it; this section may suitably be called *Brachycorythoides*, the remainder of the genus being placed in a section *Eu-Diplacorchis*. These sections may be distinguished as follows:—

Petals united to column; lip simple or trilobed with front lobe much longer than side lobes.....*Eu-Diplacorchis*.

Petals free; lip trilobed, side lobes slightly longer than front lobe*Brachycorythoides*.

The discovery of this new species in the Gold Coast considerably extends the distribution of the genus, since the nearest record is that of *D. Engleriana* Schltr. from Katsina Allah in Nigeria. The genus otherwise occurs in South and Central Africa and in Madagascar, while there is a specimen in the Kew Herbarium from Uganda.

Habenaria (§ *Diphylla*) **helicoplectrum** *Summerhayes*, sp. nov.; ex affinitate *H. armatissimae* Rehb. f. et *H. Lugardii* Rolfe, sed ab omnibus speciebus hujus sectionis calcari circinatim incurvo facile distinguenda.

Herba terrestris. *Folia* bina, humistrata, suborbicularia, 8–9 cm. longa, 10–12 cm. lata, glabra. *Scapus* cum floribus 40 cm. altus, superne cataphyllis sparsis lanceolatis tenuiter acuminatis usque 2·5 cm. longis praeditus; racemus 12 cm. longus, subdense 20–25-florus; bracteae lanceolatae, acuminatae, ovario pedicellato multo breviores. *Flores* suberecti, ovario graciliter pedicellato 2·5–3·5 cm. longo. *Sepalum* intermedium elliptico-ovatum, subacutum, ± erectum, 10–12 mm. longum, concavum; sepala lateralialia falcatisemiovata, acuta vel acuminata, reflexa, 14 mm. longa. *Petala* bipartita; partitio postica linearis, acuta, 10–12 mm. longa, sepalo intermedio adhaerens; partitio antica erecta, filiformis, 2·8 cm. longa, superne papillosa. *Labellum* tripartitum;

partitiones laterales lineari-filiformes, 2.5 cm. longae; partitio intermedia linearis, 1.5 cm. longa, lateralibus duplo latior; calcar cylindricum, superne paulo ampliatus, circinatim incurvum, 3.5 cm. longum. *Anthera* erecta, apiculata, 6 mm. longa, canalibus horizontalibus brevibus 3 mm. longis, staminodiis anguste oblongis curvatis 2 mm. longis. *Brachia* stigmatifera oblique clavata, inferne gracilia, 6 mm. longa.

TANGANYIKA TERRITORY. Pare District, Ngulu, 960 m., May 1928, *Haarer* 1435A (type in Herb. Kew.).

The nearest allies of *H. helicoplectrum* are evidently *H. armatissima* Rchb. f. and *H. Lugardii* Rolfe, which resemble it closely in flower structure and general habit, but possess much longer pendulous spurs, between 3 and 6 inches in length.

The alteration of the name of this section (*Diphylla*) to *Geophyllum* as made by Schlechter, is not permitted under the International Rules of Nomenclature, although Schlechter's name is admittedly more apt. Sectional names may be either substantival or adjectival and both types can be used in the same genus, e.g. *Combretum*.

Habenaria (§ *Diphylla*) **Snowdenii** *Summerhayes*, sp. nov.; affinis *H. villosae* Rolfe et *H. aberranti* Schltr. a quibus floribus minoribus petalis usque ad basin bipartitis differt.

Herba terrestris, perennis. *Folium* radicale, singulum, humistratum, suborbiculare, acutum, 1.3 cm. longum et latum, carnosum, minute papillato-puberulum, ciliatum. *Scapus* erectus, gracilis, cum floribus 22 cm. longus, basi vaginis duabus latis membranaceis, supra medium cataphylla lanceolata acuta instructus, villosulus; racemus breviter cylindraceus, 5 cm. longus, 1.5 cm. latus, subdense circiter 10-florus; bracteae lanceolatae, acuminatae, ovario pedicellato satis breviores, villosulae. *Flores* erecto-patentes, inversi. *Sepalum* intermedium late ovatum, obtusum, 4 mm. longum, valde concavum; sepala lateralia oblique ovata, acuta, 5 mm. longa; omnia sepala extra sparse pilosa. *Petala* bipartita, glabra; partitio postica elliptico-ovata, acuta, 3.5 mm. longa, 1.8 mm. lata; partitio antica ligulato-linearia, e basi sensim angustata, acuta, 3.5 mm. longa. *Labellum* ex ungue lata trilobatum, in toto 7 mm. longum; lobus intermedius oblongus, obtusus, 5 mm. longus, 1.75 mm. latus, basi vena incrassata superne furcata instructus; lobi laterales late lineares, acuti, 5 mm. longi, 1 mm. lati; calcar erectum, leviter incurvum, 8 mm. longum, apicem versus paulo dilatatum, subacutum. *Anthera* erecta, 2.5 mm. alta, canalibus brevibus. *Rostelli* lobus intermedius linguiformi-triangularis, obtusus, antheram vix aequans; processus stigmatiferi breves, truncati, canales antherae aequantes; ovarium breviter pedicellatum, circiter 7 mm. longum, villosulum.

UGANDA. West Nile District, Arua, in short grass savannah, 1260 m., May 1930, *Snowden* 1707 (type in Herb. Kew.). "Flowers yellowish green."

This species is very similar to *H. villosa* Rolfe and *H. aberrans* Schltr., both of which have inverted flowers with the same general construction, and hairy sepals, inflorescence and leaf. When Schlechter described *H. aberrans* as an aberrant species with no near relative he obviously overlooked Rolfe's species, since the two are very closely allied.

The three species may be separated as follows :—

Sepals 4–5 mm. long ; petals divided to the base...*H. Snowdenii*.

Sepals 6–8 mm. long ; petals bilobed in upper part only :

Spur 14–16 mm. long, pendulous.....*H. villosa*.

Spur 9 mm. long, erect, incurved.....*H. aberrans*.

Habenaria Linderi *Summerhayes*, sp. nov. ; ab *H. Thomsoni* Rchb. f. foliis angustioribus, forma sepalorum lateralium, labelli partitionibus subaequalibus, calcar cylindrico nec clavato differt.

Herba perennis, erecta, gracilis, 50–55 cm. alta. *Caulis* foliatus, teres, glaber. *Folia* erecto-patentia, circiter 6, linearia, inferiora usque 25 cm. longa et 11 mm. lata, superiora mox decrescentia et in bracteas transeuntia. *Racemus* subdense 18-florus, 15 cm. longus ; bracteae lanceolatae, acuminatae, usque 2.2 cm. longae. *Flores* erecto-patentes vel fere erecti. *Sepalum* intermedium ellipticum, utroque angustatum, obtusum, recurvum, 8 mm. longum, 3 mm. latum, glabrum ; sepala lateralibus deflexa, oblique obovata, obtusa, 9.5 mm. longa, 5 mm. lata. *Petala* erecta, bipartita, minute papillosa ; partitio postica anguste linearis, 8 mm. longa ; partitio antica linearis, obtusa, nervosa, posticae aequilonga, 1 mm. lata. *Labellum* tripartitum, glabrum, partitionibus anguste linearibus subacutis, lateralibus leviter divergentibus 9 mm. longis, intermedia paulo latiore 10 mm. longa ; calcar pendulum, fere strictum, anguste cylindricum, obtusum, 10–11 mm. longum. *Anthera* resupinata, 3 mm. longa, canalibus gracilibus 5 mm. longis, staminodiis distincte bilobis lobis divergentibus ovatis acutis. *Brachia* stigmatifera subgracilia, oblique capitata, 7 mm. longa ; rostellum lobus intermedius subulatus, subfalcatus, 3.5 mm. longus ; ovarium 9 mm. longum, pedicello 7 mm. longo.

UGANDA. Bufundi, April, *Linder* 2586 (type in Herb. Oakes Ames).

Up to the present I have been unable to segregate satisfactorily the species of Schlechter's section *Bilabrella* (Engl. Jahrb. liii. 512 : 1915) from the older section *Ceratopetalum*. Schlechter unfortunately gives a very incomplete idea as to what species he included in his section, while the sectional characters given do not seem to be very clear cut, there being quite a number of species intermediate between the two sections. For the present, therefore, I leave open the question of the section to which *H. Linderi* belongs, since it appears to be one of these intermediate types.

Habenaria limnophila *Summerhayes*, sp. nov. ; affinis *H. Weberianae* Schltr. a qua labelli lobo intermedio lateralibus dimidio

longiore, calcari leviter falcato apice breviter obtusissime ampliato nec subclavato, brachiis stigmatiferis gracilibus antherae canales excedentibus differt.

Herba terrestris, perennis, 45–75 cm. alta. *Caulis* erectus, foliatus, teres, glaber. *Folia* 6–10, erecto-patentia, inferiora 3–4 linearia, acuta, basi vaginantia, usque 33 cm. longa et 1.6 cm. lata, superiora mox in bracteas transeuntia. *Racemus* cylindraceus, subdense multiflorus, 10–20 cm. longus, 4–6 cm. diametro. *Flores* erecto-patentes; bracteae lanceolatae, acuminatae, ovario pedicellato multo breviores; pedicelli gracillimi, 1.3–2 cm. longi. *Sepalum* intermedium reflexum, ellipticum vel anguste ovatum, obtusum, 4.5–6 mm. longum, 1.5–2 mm. latum; sepala lateraliter deflexa, valde obliqua, obovata, lateraliter apiculata, 6–8 mm. longa, 3.5–4.5 mm. lata. *Petala* bipartita; partitio postica linearis, acuta, 4.5–5 mm. longa, papillosa; partitio antica lanceolato-linearis, acuta, 7–8.5 mm. longa, circiter 0.75 mm. lata, omnino vel basi tantum papillosa. *Labellum* tripartitum, glabrum; partitiones lineares, subacutae, laterales 8 mm. longae, intermedia paulo latior, 12–13 mm. longa; calcar leviter incurvatim falcatum, cylindricum, apice obtusissime ampliatum, 1.8–1.9 cm. longum. *Anthera* 3 mm. alta, canalibus gracilibus apice adscendentibus 4.5–5 mm. longis; staminodia elliptica, breviter stipitata, bifida, 1.5–2 mm. longa. *Brachia* stigmatifera gracilia, oblique capitata, 5–6 mm. longa; rostellus lobus intermedius subulatus, acutus, 2 mm. longus; ovarium 5–6 mm. longum.

TANGANYIKA TERRITORY. Mpololo, Moshi District, 1050 m., August 1928, *Haarer* 1477 (type in Herb. Kew.).

KENYA COLONY. Nairobi, in plains among long grass, 1770 m., May 1930, *Napier* 136; Aug. 1903, *A. Whyte*; in plains, 1650 m., 1916, *Dowson* 376.

UGANDA. Serire District, Rapai, in swamp, 1110 m., July 1926, *Maitland* 1308 B; locality doubtful, 1921, *C. H. Lankester*; no precise locality, in swampy land, *R. Fyffe* 256.

Flowers greenish, greenish-white or white.

This species, which, judging from the number of specimens seen, must be fairly common in the highlands between Mts. Elgon, Kenya and Kilimanjaro, is characterised chiefly by the slightly falcate spur which ends abruptly in a very slight swelling but is not at all clavate as in so many other allied species. *H. limnophila* is apparently an inhabitant of swampy land, occurring especially in the plains in the neighbourhood of Nairobi. For the section to which this species belongs see the remarks under *H. Linderi*.

Peristylus brachylobos *Summerhayes*, sp. nov.; *P. ugandensi* Rolfe proxima, sed foliis acutioribus tenuioribus, racemis laxioribus, labello breviori lobo intermedio lateralibus duplo latiore differt.

Herba terrestris, radicibus flexuosis subtomentosis. *Caulis* erectus, vix 60 cm. altus, foliatus, glaber, basi vaginis duabus acutis. *Folia* in specimine unico solum viso 11, elliptica, elliptico-ovata vel

elliptico-obovata, breviter acuminata, basi angustata, 4·5-10 cm. longa, 2·2-4 cm. lata, tenuiter chartacea, glaberrima, superiora minora. *Racemus* sublaxiflorus, in specimine apice defractus, 5 cm. longus; bracteae lanceolatae, acuminatae, usque 1·2 cm. longae. *Flores* erecti, parvi; de colore nil constat. *Sepalum* intermedium elliptico-ovatum, obtusum, 2·5 mm. longum, 1·5 mm. latum, trinervium; sepala lateralialia intermedio similia sed angustiora. *Petala* anguste et falcatis oblonga, rotundata, 2 mm. longa, uninervia. *Labellum* transverse oblongum, antice tridentatum, 1·5 mm. longum et 2 mm. latum, lobis lateralibus acutis, intermedio late triangulari acuto basi 1 mm. lato lateralibus duplo latiore disco carina humili instructo, omnibus 0·5 mm. longis; calcar obtusum, apice paulo dilatatum, 1·25 mm. longum. *Anthera* brevis, 1 mm. longa, loculis parallelis. *Brachia* stigmatifera crassa, vix 1 mm. longa, apice paulo dilatata; rostellum lobus intermedius minutus, dentiformis.

BELGIAN CONGO. Mt. Mikeno, S.W. slope, at lower margin of bamboo forest, 2265 m., March, *Linder* 2413 (type in Herb. Oakes Ames).

Bonatea ugandae Rolfe in Orch. Rev. xiv. 365, 368 (1906), nomen; affinis *B. Kayseri* Kraenzl. a qua sepalis lateralibus ungui labelli per 2 cm. adnatis, labelli partitionibus lateralibus 3·5-4 cm. longis, intermedia 2-2·5 cm. longa, canalibus antherae longioribus differt.

Herba terrestris, subrobusta, usque 75 cm. alta. *Caulis* teres, glaber, basi usque 1 cm. diametro. *Folia* infima ad cataphyllas obtusas vel acutas vaginantes redacta, media circiter 10, elliptica vel elliptico-lanceolata, rotundata usque acuta, basi vaginantia, usque 18 cm. longa, 2·5-5 cm. lata, suprema bracteis similia, lanceolata, acuminata. *Racemus* usque 25 cm. longa, laxiuscule 4-25-florus; bracteae lanceolatae, acuminatae, 2·5-5 cm. longae. *Flores* albi, suberecti vel patentes, glabri, ovario pedicellato 5-8 cm. longo. *Sepalum* intermedium ellipticum, acutum, valde concavum, 2·5 cm. longum, 1·4-1·6 cm. latum; sepala lateralialia oblique quadrata, apice acuta abrupte acuminata, margine antico dilatato angulo rotundato, margine postico circiter 2·5 cm. longo, margine antico per 2 cm. ungui labelli adnato, quo latissima 1·3-1·5 cm. lata. *Petala* bipartita; partitio postica anguste linearis, erecta, margini sepalis lateralis agglutinata et ei aequilonga; partitio antica linearis, superne leviter incrassata, 4 cm. longa, ungui labelli per 1·7 cm. adnata. *Labellum* tripartitum, ungue 2·7-3 cm. longa, partitionibus lateralibus anguste linearibus antice attenuatis acutis 3·5-4 cm. longis, intermedia angustiore 2-2·5 cm. longa, cornu erecto obtuso in basi labelli ante ostium calcaris; calcar cylindricum, obtusum, dependens, 12-15 cm. longum. *Anthera* 1·7 cm. alta, rostrata, canalibus suberectis tenuibus 2·2-2·5 cm. longis, staminodiis obovatis subcarnosis 1·5 mm. longis. *Rostelli* lobus intermedius

cucullatus, abrupte acuminatus, 8-9 mm. longus; brachia stigmatifera anguste clavata, apice complanata, 2.6-3.2 cm. longa, dimidio inferiore ungui labelli agglutinata.

UGANDA. Busoga, Jinja, 1170 m., May 1904, *E. Brown* 50 (type in Herb. Kew.).

KENYA COLONY. Ayam River, Rumuruti, N.E. slope of Aberdare Mts., 2100 m., *Dowson* 634.

BELGIAN CONGO. Nurungi, Jan. 30th, 1927, *Linder* 1968.

This species is one of the largest flowered of the genus and is very similar to *B. Kayseri*, from which it differs chiefly in the lip. Brown's specimen was named in manuscript by Rolfe many years ago but no description has previously been published. A specimen was exhibited at a meeting of the Royal Horticultural Society on November 6th, 1906, where it was awarded a Botanical Certificate.

Satyrium (§ *Leptocentrum*) **acutirostrum** *Summerhayes*, sp. nov.; affinis *S. sceptrum* Schltr. a quo floribus paulo majoribus, calcaribus ovario dimidio longioribus, rostellum lobo intermedio longiore lineari-subulato nec ovato differt.

Herba robusta usque 85 cm. alta, caule cataphyllis anguste ellipticis vel lanceolatis obtusis usque acuminatis laxe vaginantibus omnino obtecto. *Folia* vera desunt. *Spica* 15 cm. longa, 2.5 cm. diametro, densiflora; bracteae late lanceolatae, acuminatae, flores excedentes, demum reflexae, usque 2.5 cm. longae. *Flores* erecto-patentes, illis *S. robusti* Schltr. paulo minores. *Sepalum* intermedium anguste ellipticum, obtusum, 7 mm. longum, 2 mm. latum; sepala lateralibus paulo longiora et latiora, leviter curvata, basi labello connata. *Petala* elliptica, rotundata, 6.5 mm. longa, 2.5 mm. lata, parte quarta infima sepalis connata. *Labellum* cucullatum, semi-globosum, apice angustum obtusum, 8 mm. longum, ostio pro sectione lato; calcaria cylindrica, ovario parallela, 1.6 cm. longa, 1 mm. diametro. *Columna* 6.5 mm. longa, curvula; stigma transverse oblongum; rostellum 3 mm. longum, lobis lateralibus brevissimis dentiformibus, intermedio e basi 1 mm. lata lineari-subulato. *Ovarium* sessile, 1 cm. longum, glabrum.

BELGIAN CONGO. Kibati, at foot of Mount Ninagongo, Feb. 16th, 1927, *Linder* 2107 (type in Herb. Oakes Ames).

A species belonging apparently to the group within § *Leptocentrum* possessing leaves developed on sterile shoots, although there are no leaves in the present specimen. Of the species of this group *S. sceptrum* Schltr. is the most nearly related, but differs in the possession of smaller flowers, the spurs equalling the ovary, and the middle lobe of the rostellum being shorter and broadened.

Disperis katangensis *Summerhayes*, sp. nov.; affinis *D. zeylanicae* Trimen et *D. neilgherrensi* Wight, ab utraque floribus majoribus, appendicibus labelli lobis brevibus strictis rotundatis nec divaricatis cornutis differt.

Caulis strictus, bifolius, teres, glaber, 8–13 cm. altus, uni- vel biflorus. *Folia* patentia, sessilia, late ovata, basi cordata, apiculata vel breviter acuminata, 8–12 mm. (lobis basalibus inclusis 9–15 mm.) longa, 8–14 mm. lata. *Bractea* foliis bene similis, subpatens, ovario circiter dimidio brevior, 5–10 mm. longa. *Flos* pro genere magnus, erectus. *Sepalum* intermedium lineare, superne sensim attenuatum, 1.6 cm. longum; sepala lateralia libera, longitudinaliter semi-orbicularia, latere antico stricto, apice apiculata, 1.2–1.5 cm. longa, 7–8 mm. lata, medio in sacculum humilem obtusissimum producta. *Petala* elliptico- vel lanceolato-ovata, 1.6 cm. longa, cum sepalo intermedio galeam hemisphaeroideam 1.2–1.3 cm. longam formantia. *Labellum* lineare, basi faciei columnae adnatum, superne refractum, apice obovato-spathulatum, cuspidatum, supra crista integra instructum, papillato-pubescent, parte integra labelli in toto 5 mm. longa: appendix labelli erecta, e basi cuneata truncato-triangularis, hastata, antice biloba, lobis strictis rotundatis, in toto 3.5 mm. longa, quo latissima 4 mm. lata, superne dense pubescens. *Columna* brevis; rostellum brachia circinatim incurva, apice erecta, brevia, obtusissima. *Ovarium* glabrum, leviter 6-alatum.

BELGIAN CONGO. Katanga, Kisinga Valley, in shady moist places, May 5th, 1924, *C. W. von Hirschberg* 168. "The hood is pale pink veined with pink, the lip darker pink. The leaves are white-veined and are magenta beneath."

The species, whose nearest African relative is *D. mossambicensis* Schltr., is, however, most closely allied to the two Southern Indian species. The four species belong to a group within the genus occurring otherwise in the Indo-Malayan region, the two African species being the most westerly members of the group and being less closely related to the remaining African species of the genus.

Polystachya (§ *Caulescentes*) **retusiloba** *Summerhayes*, sp. nov.; affinis *P. Rivae* Schweinf., a qua statura minore, foliis multo brevioribus, inflorescentiis racemosis, labelli lobis lateralibus rotundatis emarginatisve, callo linguiformi differt.

Epiphytica; radices copiosae, flexuosae, glabrae. *Caules* cylindrici, erecti, cum floribus usque 13 cm. alti, duabus tertiis superioribus foliati, basi vaginis arctis obtusis instructi. *Folia* lineari-oblonga, apice obtusa brevissime bilobulata, basi vaginantia, laminis usque 5.5 cm. longis et 1.1 cm. latis tenuiter chartaceis. *Inflorescentiae* racemosae, usque 4.5 cm. longae, apice dense pluriflorae; flores erecti; bractae lanceolatae, acutae, subimbricatae, ovario pedicellato breviores. *Sepalum* intermedium lanceolatum, acutum, 9 mm. longum, 4 mm. latum, concavum; sepala lateralia oblique triangularia, acuta, 9 mm. longa, basi mentum obtusum 8.5 mm. longum formantia, marginibus leviter incurvis. *Petala* lineari-spathulata, subacuta, 8 mm. longa, infra apicem 1.75 mm. lata. *Labellum* breviter unguiculatum, trilobum, 9 mm. longum et latum; lobi laterales semiorbiculares, antice rotundati, emarginati; lobus intermedius anguste ovatus, subacutus, marginibus inflexis,

4 mm. longus, 3 mm. latus, in disco puberulus; callus linguiformis, apice truncatus vel leviter retusus, e basi labelli usque medium decurrens. *Columna* 5 mm. longa, antice leviter excavata.

BELGIAN CONGO. Mt. Miken, camp Ruero on south-west slope, 2850 m., Mar. 10th, 1927, *Linder* 2096a (type in Herb. Oakes Ames).

This is the first species of § *Caulescentes* recorded from the volcanic area north of Lake Kivu, but *P. imbricata* Rolfe occurs on Ruwenzori and two other species occur near Lake Victoria to the east. The present species bears a strong resemblance to several others, e.g. *P. Rivae* Schweinf., *P. oligophylla* Schltr. (which, although a much larger plant with longer leaves, has considerably smaller flowers) and *P. imbricata* Rolfe. The last-named has less prominent lateral lobes to the lip, definitely falcate and acuminate sepals, smaller flowers and rather different leaves. Although it is very doubtful if all the plants referred by Kraenzlin to *P. imbricata* can be considered conspecific they all differ from *P. retusiloba* in the above characters. The characters distinguishing the new species from *P. Rivae* are given in the diagnosis.

Polystachya (§ *Calluniflorae*) **erythrocephala** *Summerhayes*, sp. nov.; a *P. Stuhlmannii* Kraenzl. foliis apice acutis, inflorescentiis foliis multo brevioribus, floribus duplo majoribus differt.

Caules basi incrassati, e rhizomate brevi, approximati, usque 3 cm. longi, apice 2-3-foliati, vaginis fere omnino obtecti. *Folia* linearia, acuta, 4-10 cm. longa, 3-6 mm. lata, subcoriacea. *Inflorescentiae* racemosae, circiter 2 cm. longae, subdense 3-6-florae; pedunculus vaginis lanceolatis membranaceis acutis flores infimos attingentibus tunicatus; bractae lineari-subulatae, 3-6 mm. longae, ovarium pedicellatum superantes; rhachis dense setulosa. *Flores* erecto-patentes, pro sectione mediocres. *Sepalum* intermedium ovatum, acuminatum, 3.5-4 mm. longum, concavum; sepala lateralia ovato-triangularia, leviter falcata, longiuscule acuminata, margine dorsali 5 mm. longa, basi 3.75 mm. lata, mentum amplum rotundatum formantia. *Petala* linearia, acuta, leviter falcata, 2.75 mm. longa. *Labellum* ex ungue brevissima cuneatim dilatatum, trilobum, medio inter bases loborum lateralium carnosum, in toto fere 4.5 mm. longum, supra ubique setulosum; lobi laterales erecto-patentes, quadrato-rotundati, 0.7 mm. longi, 1.3 mm. lati; lobus intermedius anguste triangularis, acuminatus, valde reflexus, 1.5 mm. longus, basi 0.8 mm. latus. *Columna* 1.5 mm. alta et lata; anthera lata, rotundata. *Pollinii* stipes linearis, superne dilatata, 0.6 mm. longa; glandula oblonga, antice apiculata, postice breviter hastata.

NORTHERN RHODESIA. In gorge two miles south of Solwezi, among rocks near river, in full sun, June, 1930, *Milne-Redhead* 504. Flowered at Royal Botanic Gardens, Kew, Dec. 30th, 1930 (type in Herb. Kew.).

Flowers greenish-yellow. Column with purplish rim to stigma; anther cap deep reddish-purple.

A striking little species of an epiphytic type but collected, in resting condition, on a rock in full sun. It differs from all the species of § *Calluniflorae* in the possession of acute leaves, but quite clearly belongs to this section in all other respects. The species is apparently closely allied to *P. Stuhlmannii* Kraenzl. of which, however, I have not seen an authentic specimen. The recurved middle lobe of the lip is common to both, as well as other floral features, but the two differ in several respects as shown in the diagnosis.

Polystachya (§ *Superpositae*) **kermesina** Kraenzl. in Engl. Jahrb. xliii. 333 (1909), et in Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped. ii. 74, t. vii. fig. D-E (1910).

This species is placed by Kraenzlin in § *Grandiflorae* in his monograph of the genus.* Examination of the type specimen shows, however, that the pseudobulbs are superposed in the same manner as in other species of § *Superpositae*. This feature is not mentioned in the original description, nor is it shown in the figure cited above. This was due to the way in which the specimen had been mounted so that the pseudobulbs were almost hidden under a mass of roots.

P. kermesina differs in certain respects from other members of § *Superpositae*, showing in the inflorescence, especially the hairy rhachis, a strong resemblance to certain species in § *Grandiflorae*. The structure of the flowers, and particularly the peculiar lip, differentiates the species from all others examined by me. The lip is fused to the foot of the column at the base, the lower half being parallel and adpressed to the column and apparently held in position by the projecting rostellum, while the upper half is then recurved so sharply and completely that it also lies parallel to both the lower portion of the lip and the column foot. When more is known of the genus it may be found necessary to create a separate section for this remarkable little species.

For the present it seems advisable to transfer the species to § *Superpositae* since the current classification of the genus on vegetative characters seems on the whole satisfactory, and the group with superposed pseudobulbs is sharply defined from all others in that respect.

In order to complete the description given by Kraenzlin the following description of the pseudobulbs is added :—

Pseudobulbi superpositi, seriati, teretes, graciles, 1–3 cm. longi, 1–2 mm. diametro, inferne cataphyllis superne vaginis foliorum tunicati; totum sympodium usque 6 cm. longum.

BELGIAN CONGO. Mt. Ninagongo, N. of Lake Kivu, 2800–2900 m., Feb. 1909, *Mildbraed* 1348 (type); Feb. 1927, *Linder* 2093.

Polystachya (§ *Superpositae*) **spatella** Kraenzl. in Engl. Jahrb. xix. 251 (1894).—*P. Elliotii* Rendle in Journ. Bot. xxxiii. 198 (1895).

In his monograph† Kraenzlin separates these species from one another on the length of the claw of the lip, *P. Elliotii* being said to

*Fedde, Repert. Beih. xxxix. 92 (1926).

†l.c. p. 101.

possess a short claw and *P. spatella* a long one. It is difficult to see, however, how this concept of *P. Elliotii* originated, since the original description reads "labello longe unguiculato" and the examination of a duplicate type specimen confirms this statement.

On examination of the type specimen of *P. spatella* Kraenzl., and comparison with *P. Elliotii*, I can see no differences warranting specific segregation. The distinctions mentioned by Rendle, who did not see the type specimen of *P. spatella*, are only apparent, being dependent on the different methods of describing the lip adopted by the two authors. Actually the specimens of the two species agree extremely well.

Polystachya (§ *Cultriformes*) **angustifolia** *Summerhayes*, sp. nov. ; affinis *P. gracilentae* Kraenzl., a qua foliis angustioribus, inflorescentiis racemosis nec paniculatis, floribus minoribus, mento multo brevior, labello brevior forma divergente differt.

Epiphytica. *Caules* caespitiosi, gracillimi, usque 15 cm. alti, basi 2 mm. diametro, siccitate valde sulcati, apice monophylli, basi radicibus copiosis flexuosis glabris instructi. *Folia* linearia, apice subacuta, basi leviter vaginantia, 9-12 cm. longa, 3-6 mm. lata, tenuiter coriacea. *Inflorescentiae* racemosae, foliis paulo breviores, subaxe 7-11-florae, basi spatha vaginante 2-2.5 mm. longa instructae; bractae anguste triangulares, acuminatae, subrigidae, usque 4 mm. longae. *Flores* suberecti, pro sectione parvi. *Sepalum* intermedium lanceolatum, acutum, 4.5-5 mm. longum; sepala lateraliter subfalcatis triangularia, subacuta, 5-6 mm. longa, basi 3 mm. lata, antice obtusangula, mentum brevem fere 3 mm. longum formantia. *Petala* oblanceolato-spathulata, subacuta, 4.5-5 mm. longa, superne 1 mm. lata. *Labellum* ex ungue brevi sensim dilatatum, ambitu oblongum, apice rotundatum, infra medium utrinque lobulo brevissimo rotundato instructum, 4.5-5 mm. longum, infra medium 1.8-2 mm. latum, disco omnino nudo, venis vix incrassatis. *Columna* brevis, leviter complanata, fere 2 mm. longa.

BELGIAN CONGO. South-west slope of Mt. Mikenö, epiphytic on bamboo, 2430 m., March, *Linder* 2395 (type in Herb. Kew.).

This rather striking member of § *Cultriformes* is characterised by the relatively narrow leaves and loose racemose inflorescence. Unfortunately no information is available as to the colour of the flowers. Kraenzlin in his monograph* uses the shape of the lip, whether simple, obscurely trilobed, or distinctly trilobed, for separating the species of this section. In my opinion this is not a satisfactory character and much more distinct groups can be recognised from the leaf characters, some species possessing narrow obtuse leaves as in the species here described, others broad cordate and often acute leaves, while in others the leaves are terete or nearly so.

P. angustifolia is yet another example of the section from the volcanic region in the neighbourhood of Lake Kivu, the number of

*l.c. pp. 106-107.

species recorded from this area being now seven. From the area between Lakes Kivu and Albert (including Ruwenzori) 11 of the 27 described species of the section have been recorded, the Cameroons district coming next with 8 species.

Bulbophyllum miniatum Hort. in Orch. Rev. xii. 118 (1904), nomen ; F. W. Moore in Journ. Roy. Hort. Soc. xxxiii. 381, t. 53 (1908).

This species, of which the origin is obscure, but which is said to come from the Congo region, is first recorded in cultivation at Glasnevin Botanic Gardens, where it flowered in August, 1903. It was exhibited by Messrs. Sander and Sons at a meeting of the Royal Horticultural Society in March, 1904. In April of the same year an inflorescence was sent to Kew from Mr. O'Brien of Harrow from what was apparently the plant exhibited by Sander. Later (1906) a specimen was received at Kew from the Jardin des Plantes, Paris, under the name *B. saltatorium* var. *affine*, while in 1920 a specimen was cultivated at Kew as *B. Kindtianum* De Wild. In January of this year a plant of unknown origin labelled *B. saltatorium* flowered at Kew and was found to be *B. miniatum*.

The species was very shortly described by F. W. Moore in 1908 in an article entitled "Lesser Known Orchids" and a photograph of the inflorescence accompanied this description. This photograph shows plainly the character by which the species may be distinguished from all its allies except *B. inopinatum* W. W. Sm., namely, the very short narrow bracts. *B. inopinatum* is a much larger plant with orbicular petals, whereas in *B. miniatum* these are subulate-filiform.

In the original accounts the hairs on the lip are described as white, but those on Mr. O'Brien's specimen are faintly tinged with pink at the base, and it is probable that greater stress was laid on the whitish colour as contrasting with the red hairs of *B. barbigerum* Lindl. and other allied species. In the other specimens in the Kew Herbarium as well as in the living plant which flowered recently the hairs are pale pink.

As the descriptions so far given are insufficient clearly to define the species from others I subjoin a complete description of it based on all the material available. Unfortunately the specimen which was figured and which represents the type does not seem to have been preserved.

B. miniatum Hort. ex F. W. Moore ; affinis *B. Kindtiano* De Wild., a qua floribus minoribus, bracteis dimidio brevioribus angustioribus differt.

Epiphytica. *Pseudobulbi* 1-2 cm. distantes, ovoidei, biconvexi vel majores 3-4-angulati, usque 2 cm. longi et 1.7 cm. lati, inclinati, apice obtusi, unifoliati. *Folia* elliptica, vel oblongo-elliptica, brevissime petiolata, apice levissime obtuseque bifida, usque 7 cm. longa et 1.8 cm. lata. *Scapus* gracilis, teres, usque 36 cm. longus, cataphyllis paucis vaginantibus obsitus ; racemus 6-15 cm. longus, sublaxe

7-15-florus ; bracteae lanceolatae, acutae, circiter 3 mm. longae. *Flores* erecto-patentes. *Sepala* lanceolata, acuta, subreflexa, 6 mm. longa, supra basin 2 mm. lata, ciliata. *Petala* sepalis multo minora, subulato-filiformia, 3 mm. longa. *Labellum* lanceolato-ligulatum, acutum, basi medio callis humilis duobus parallelis instructum, dimidio superiore pilis 3-5 mm. longis barbatum. *Columna* brevis, apice in aristas subulatas erectas 1 mm. longas producta ; anthera acuminata.

Said to come from the Congo. At Kew are specimens cultivated at Harrow by Mr. O'Brien in 1904 ; and at the Royal Botanic Gardens, Kew, in 1906, 1920 and 1931.

Sepals wine-coloured, greenish near tips ; petals deep wine-coloured. Lip as petals, hairs pale pink. Column greenish-wine-coloured ; anther greenish.

Aërangis ugandensis *Summerhayes*, sp. nov. ; affinis *A. hololotti* Schltr. et *A. hyaloidi* (Rchb. f.) Schltr., ab illa floribus minoribus petalis quam sepalo intermedio haud latioribus, labello obtuse apiculato, calcarì dimidio longiore, ab hac foliis anguste cuneato-ob lanceolatis bilobis, inflorescentia laxa differt.

Epiphytica ; caulis brevis, erectus, usque 8 cm. longus, radicibus glabris albido-viridibus 3-4 mm. diametro instructus. *Folia* disticha, cuneata vel cuneato-ob lanceolata, apice inaequaliter obtuse biloba, basi breviter vaginantia, 5-15 cm. longa, supra medium 1.5-2 cm. lata, coriacea, siccitate multinervia. *Scapi* pauci (circiter 2), subdependentes, circiter 7 mm. longi, sublaxe 7-10-flori ; bracteae latissimae, truncatae, 2 mm. longae. *Flores* patentes vel subreflexi, albi. *Sepala* oblongo-lanceolata, apiculata vel subacuminata, 6-8 mm. longa, 3 mm. lata. *Petala* oblongo-lanceolata, acuta, 6-7 mm. longa, sepalis aequilata. *Labellum* oblongum, subito breviterque acutatum, 6-7 mm. longum, medio 3-4 mm. latum ; calcar anguste tubulosum, rectum, 1-1.2 cm. longum, obtusum. *Columna* brevis, inferne teres, superne paulo dilatata, 2 mm. longa ; pollinia ellipsoideo-sphaeroidea, aurea, stipiti communi lineari 1 mm. longa affixa, glandula unica disciformi ; rostellum 0.5 mm. longum, lineare, indivisum. *Ovarium* cum pedicello 1-1.2 mm. longum, viride, glabrum.

UGANDA. Mt. Elgon, on trees in forest, 1500 m., May 17th, 1925, *Snowden* 879 (type in Herb. Kew.). Cult. Royal Botanic Gardens, Kew, received from J. D. Snowden, 1925.

The plant belongs to a small group of species in the genus possessing a short spur and small flowers, the other two members being found in Madagascar and Ceylon respectively.

L.—RESEARCHES ON *SILENE MARITIMA* AND *S. VULGARIS*: VII.* E. M. MARSDEN-JONES AND W. B. TURRILL.

NATURAL OFFSPRING OF A WILD HYBRID.

In the second paper of this series (*Kew Bull.* 1929, p. 34) we described and figured a wild hybrid (No. 22) between *Silene maritima* and *S. vulgaris*, which we found on 19th July, 1928, at the Abbotsbury end of the Chesil Beach, Dorset. This plant was producing plenty of seeds, some of which were collected. There was no sign of an unusual amount of infertility among the seeds, indeed the seeds collected would be described as a good sample for wild seed as compared with either parent species. The seeds were sown at Kew in the spring of 1929 as K.703, and 66 plants were raised to maturity in 1930. More than half flowered the first year (July to Sept.), but the scoring for vegetative and floral characters was made on 24th June, 1930, and fruits and seeds were collected in early September, 1930.

It should be recalled that only one plant of *S. vulgaris* was found in the immediate neighbourhood of the hybrids (No. 22 and several others), and this was female. It is, of course, possible that other individuals of *S. vulgaris* formerly existed within pollinating distance. Very large numbers of *S. maritima* plants grew on the shingle all around and showed a large range of intra-specific variation. Since the collected seeds resulted from natural open pollination the chances strongly favoured back-crossing with different individuals of *S. maritima*, and the analyses of characters in the offspring, given below, support this view.

The interest of the population here scored is that it indicates how the products of hybridization can be absorbed into that parent species which dominates in numbers of individuals in the immediate neighbourhood. Had the original *S. vulgaris* parent been hairy the results would have been still more interesting. There can be no doubt that intra-specific polymorphism is increased, within what is normally regarded as a species population, by chance and infrequent crossings.

The following symbols are used in this paper :—

M, i.e. of the *maritima* type.

V, i.e. of the *vulgaris* type.

H, i.e. of the F₁ hybrid type (*maritima* x *vulgaris*).

When used in combinations the scored character has an intermediate expression, the second symbol indicating the direction of bias.

The following table is arranged to show from which parent the characters scored were derived.

<i>maritima.</i>	<i>vulgaris.</i>
Stems prostrate.	Stems erect.
Barren shoots present.	No (or very few) barren shoots.
Flowers 1 to 7.	Flowers numerous.

* Continued from *Kew Bull.* 1931, p. 352.

Flowers regular.

Calyx M.

Petals and segments overlap (probably here *maritima* characters).

Scale.

Immature seeds pink (probably here a *maritima* character).

Capsules M.

Seeds armadillo (probably here a *maritima* character).

Flowers zygomorphic.

Calyx V.

Petals and segments diverge (probably here *vulgaris* characters).

Boss.

Immature seeds white (probably here a *vulgaris* character).

Capsules V.

Seeds tubercled (probably here a *vulgaris* character).

In addition it should be noted :—

1. Barren shoots were present in small numbers in all plants, unless otherwise stated.

2. The stem lengths were maxima at the time of scoring.

3. The foliage and general appearance of the plants were of the H type, with mostly a verge towards M, except in Nos. 10 (V-H), 13 (M), 17 (M), 24 (H-V), 25 (H-V), 26 (M), 27 (V-H), 29 (V-H), 30 (M), 31 (H-V), 32 (H-V), 33 (H-V), 34 (M), 36 (H-V), 39 (H-V), 47 (H-V), 53 (V-H), 54 (H-V), 57 (V-H), 61 (V-H), and 65 (V-H).

4. The number of flowers as given indicates number per inflorescence, not number per plant.

5. The flowers were slightly zygomorphic, except where otherwise stated.

6. The petals were bilobed, except where otherwise stated.

7. No anthocyanin blotch occurred on any of the petals.

8. The anthers in all the hermaphrodite plants had some purple in them.

Characters of individual plants from wild hybrid.

1. Stems very prostrate, 5·7 dm., with medium amount of anthocyanin. Flowers 5 to 7, regular, Calyx H-M, veined with medium amount of anthocyanin. Petals and segments overlap, H scale. Filaments and stigmata white. Immature seeds pink. Capsules M. Seeds armadillo.

2. Stems semi-prostrate, 3·7 dm., with little anthocyanin. Flowers 1 to 6, regular. Calyx H, veined with little anthocyanin. Petals and segments overlapping, H scale. Filaments, stigmata, and immature seeds pink. Capsules H-M. Seeds tubercled.

3. Stems prostrate but ends ascending, 5·7 dm., with little anthocyanin. Flowers 7 to 10. Calyx H-V, with medium amount of anthocyanin. Petals and segments overlap, small H scale. Stigmata white. Filaments and immature seeds pink. Capsules H. Seeds tubercled.

4. Stems prostrate, 5·7 dm., with medium amount of anthocyanin. Flowers 4 to 9, regular. Calyx H-V, with medium amount of anthocyanin. Petals and segments overlap, boss to H scale. Filaments and stigmata white. Immature seeds pink. Capsules M. Seeds tubercled.

5. Stems prostrate but ends ascending, 3·7 dm., with much anthocyanin. Flowers 7 to 9, female. Calyx H, veined with medium amount of anthocyanin. Petals and segments overlap, small H scale. Stigmata white. Immature seeds pink. Capsules V (?). Seeds strongly tubercled.

6. Stems erect, 4·5 dm., with small amount of anthocyanin. Flowers 7 to 14, hermaphrodite and female. Carlyx V, veined with little anthocyanin. Petals and segments overlap, H scale. Filaments and stigmata white. Immature seeds pink. Capsules H. Seeds tubercled.
7. Stems prostrate, 3·5 dm., with medium amount of anthocyanin. Flowers 6 to 7, hermaphrodite and female. Calyx V-H, with medium amount of anthocyanin. Petals and segments diverge, H scale. Filaments, stigmata, and immature seeds white. Capsules V. Seeds weak armadillo (?).
8. Stems prostrate, 5·5 dm., with medium amount of anthocyanin. Flowers 3 to 5, female. Calyx M-H, with medium amount of anthocyanin. Petals and segments overlap, very small H scale. Stigmata white. Immature seeds pink. Capsule H. Seeds tubercled.
9. Stems prostrate, 3·7 dm., with much anthocyanin. Plant poor and not in flower.
10. Stems prostrate, with few barren shoots, 4·0 dm., with small amount of anthocyanin. Flowers 4 to 7. Calyx V, with little anthocyanin. Petals diverge, segments overlap, H scale. Filaments, stigmata, and immature seeds white. Capsules V. Seeds strongly tubercled.
11. Stems prostrate, with few barren shoots, 3·5 dm., with little anthocyanin. Flowers 3 to 7. Calyx M-H, with little anthocyanin. Petals diverge, segments overlap, H. scale. Filaments and stigmata white. Immature seeds pink. Seeds weak armadillo.
12. Stems prostrate, 3·2 dm., with little anthocyanin. Flowers 5 to 7, female and hermaphrodite. Calyx H, with little anthocyanin. Petals and segments overlap, small H scale. Filaments pink. Stigmata white. Immature seeds pink.
13. Stems prostrate, compact, with numerous barren stems and general habit of *S. maritima*, 4·0 dm., with medium amount of anthocyanin. Flowers 2 to 5, regular. Calyx M, with medium amount of anthocyanin. Petals and segments overlap, good scale. Filaments and stigmata white. Immature seeds pink. Capsules M. Seeds strongly tubercled.
14. Stems prostrate, 3·5 dm., with medium amount of anthocyanin. Flowers 3 to 6. Calyx V-H, with little anthocyanin. Petals and segments overlap, boss. Filaments and stigmata white. Immature seeds pink, Capsules H. Seeds strongly tubercled.
15. Stems sub-erect, 3·7 dm., with medium amount of anthocyanin. Flowers 2 to 3. Calyx H-M, with little anthocyanin. Petals and segments overlap, H scale. Stigmata white. Filaments and immature seeds pink. Capsules H-M. Seeds strongly tubercled.
16. Stems very prostrate, 5·5 dm., with medium amount of anthocyanin. Flowers 3 to 7. Calyx H, with little anthocyanin. Petals and segments diverge, H scale. Filaments and stigmata white. Immature seeds pink. Capsules M. Seeds armadillo.
17. Stems sub-erect, 3·7 dm., with little anthocyanin. Flowers 2 to 4. Calyx H-M, with little anthocyanin. Petals and segments overlap, H scale. Filaments and stigmata white. Immature seeds pink. Capsules M. Seeds tubercled.
18. Stems prostrate, 5·0 dm., with medium amount of anthocyanin. Flowers 4 to 6. Calyx H-V, with little anthocyanin. Petals and segments overlap, H scale. Filaments and stigmata white. Immature seeds pink. Capsules H. Seeds weak armadillo.
19. Stems prostrate, 3·7 dm., with much anthocyanin. Flowers 7 to 10. Calyx V-H, with medium amount of anthocyanin. Petals and segments overlap, H scale. Filaments and stigmata white. Immature seeds pink. Capsules H. Seeds tubercled.

20. Stems prostrate, 5.2 dm., with much anthocyanin. Flowers 5 to 11, regular. Calyx H-V, with little anthocyanin. Petals and segments diverge, H scale. Filaments and stigmata white. Immature seeds pink. Capsules H. Seeds strongly tubercled.
21. Stems prostrate, 4.2 dm., with much anthocyanin. Flowers 6 to 7, female. Calyx H-V, with little anthocyanin. Petals overlap, segments diverge, H scale. Stigmata and immature seeds white. Capsules V. Seeds weak armadillo.
22. Stems sub-erect, 4.0 dm., with little anthocyanin. Flowers 3 to 5. Calyx V-H, with little anthocyanin. Petals and segments overlap, H scale. Filaments and stigmata white. Immature seeds pink. Capsules M-H. Seeds tubercled.
23. Stems sub-erect, 5.2 dm., with little anthocyanin. Flowers 4 to 7, regular. Calyx M, with medium amount of anthocyanin. Petals and segments overlap, H scale. Filaments and stigmata white. Immature seeds pink. Capsules M. Seeds armadillo.
24. Stems very prostrate, with very few barren shoots, 5.0 dm., with much anthocyanin. Flowers 6 to 13. Calyx V, with little anthocyanin. Petals overlap, segments diverge, H scale. Filaments and stigmata white. Immature seeds pink. Capsules H-M. Seeds tubercled.
25. Stems very prostrate, with very few barren stems, 6.0 dm., with medium amount of anthocyanin. Flowers 5 to 11. Calyx H-M, with little anthocyanin. Petals overlap, segments diverge, H. scale. Filaments and stigmata white. Immature seeds pink. Capsules H-M. Seeds weak armadillo.
26. Stems prostrate, 5.5 dm., with little anthocyanin. Flowers 3 to 6, regular. Calyx V, with little anthocyanin. Petals overlap, segments diverge, H scale. Filaments and stigmata white, immature seeds pink. Capsules M. Seeds armadillo.
27. Stems very prostrate, with few barren shoots, 6.5 dm., with much anthocyanin. Flowers 3 to 8, regular. Calyx M, with little anthocyanin. Petals and segments diverge, H scale. Filaments and stigmata white. Immature seeds pink. Capsules H-M. Seeds weak armadillo.
28. Stems prostrate, 3.5 dm., with little anthocyanin. Flowers 3 to 7. Calyx H-V, with little anthocyanin. Petals and segments diverge, boss. Filaments and stigmata white. Immature seeds pink. Capsules M-H. Seeds tubercled.
29. Stems prostrate, with very few barren shoots, 4.5 dm., with much anthocyanin. Flowers 7 to 20. Calyx V, with little anthocyanin. Petals diverge, segments overlap, H scale. Filaments and stigmata white. Immature seeds pink. Capsules M. Seeds tubercled (weak).
30. Stems sub-erect, compact, with numerous barren shoots, 5.2 dm., with little anthocyanin. Flowers 3 to 7, very slightly zygomorphic. Calyx M, with medium amount of anthocyanin. Petals and segments overlap, H scale. Filaments and stigmata white. Immature seeds pink. Capsules M. Seeds tubercled.
31. Stems prostrate, with few barren shoots, 6.0 dm., with medium amount of anthocyanin. Flowers 6 to 7. Calyx H-M, with little anthocyanin. Petals and segments overlap, H scale. Filaments and stigmata white. Immature seeds pink. Capsules M-H. Seeds armadillo.
32. Stems prostrate, with few barren shoots, 5.7 dm., with much anthocyanin. Flowers 7 to 12. Calyx H-M, with medium amount of anthocyanin. Petals and segments overlap, H scale. Filaments and stigmata white. Immature seeds pink. Capsules M-H. Seeds tubercled (weak).
33. Stems prostrate, 4.5 dm., with much anthocyanin. Flowers 10 to 11. Calyx H, with medium amount of anthocyanin. Petals and segments diverge,

H scale. Filaments, stigmata, and immature seeds white. Capsules H-V. Seeds tubercled.

34. Stems prostrate, with numerous barren shoots, 4.5 dm., with little anthocyanin. Flowers 7 to 13, regular. Calyx H, with little anthocyanin. Petals and segments overlap, H scale. Filaments and stigmata white. Immature seeds pink. Capsules M. Seeds strongly tubercled.

35. Stems prostrate, with many barren shoots, 3.5 dm., with little anthocyanin. Flowers 3 to 6. Calyx H, with little anthocyanin. Petals and segments overlap, H scale. Filaments and stigmata white. Immature seeds pink. Capsules M. Seeds tubercled.

36. Stems prostrate, with few barren shoots, 5.0 dm., with much anthocyanin. Flowers 10 to 13. Calyx H-V, with medium amount of anthocyanin. Petals and segments diverge, H scale. Filaments and stigmata white. Immature seeds pink. Capsules H-M. Seeds weak armadillo.

37. Stems prostrate, 4.2 dm., with medium amount of anthocyanin. Flowers 3 to 5. Calyx H, with little anthocyanin. Petals and segments diverge, H scale. *Filaments, stigmata, and immature seeds pink. Capsules M. Seeds tubercled.

38. Stems sub-erect, 5.0 dm., with medium amount of anthocyanin. Flowers 7 to 13. Calyx H-V, with medium amount of anthocyanin. Petals and segments diverge, some petals multilobed, boss. Filaments and stigmata white. Immature seeds pink. Capsules H-M. Seeds tubercled.

39. Stems very prostrate, 4.7 dm., with much anthocyanin. Flowers 7 to 14. Calyx M-H, with little anthocyanin. Petals and segments overlap, H scale. Filaments and stigmata white. Immature seeds pink. Seeds weak armadillo.

40. Stems sub-erect, 5.0 dm., with a medium amount of anthocyanin. Flowers 3 to 7, regular to very slightly zygomorphic. Calyx H-M, with a medium amount of anthocyanin. Petals and segments overlap, H scale. Filaments, stigmata, and immature seeds pink. Capsules M. Seeds armadillo.

41. Stems sub-erect, 5.5 dm., with a medium amount of anthocyanin. Flowers 6 to 7, regular. Calyx M, with a medium amount of anthocyanin. Petals and segments overlap. Stigmata white. Filaments and immature seeds pink. Capsules M. Seeds weak armadillo.

42. Stems sub-erect, 3.5 dm., with much anthocyanin. Flowers 5 to 7. Calyx H-V, with little anthocyanin. Petals and segments overlap, H scale. Stigmata and filaments white. Immature seeds pink. Capsules H. Seeds armadillo.

43. Stems very prostrate, 5.0 dm., with much anthocyanin. Flowers 3 to 9. Calyx H, with little anthocyanin. Petals and segments overlap, some petals multilobed, boss. Filaments and stigmata white. Immature seeds pink. Capsules H. Seeds tubercled.

44. Stems prostrate, 5.2 dm., with little anthocyanin. Flowers 6 to 9. Calyx H-M, with little anthocyanin. Petals and segments diverge, H scale. Filaments and stigmata white. Immature seeds pink. Capsules H-M. Seeds tubercled.

45. Stems sub-erect, 4.2 dm., with little anthocyanin. Flowers 3 to 7. Calyx H, with little anthocyanin. Petals and segments overlap, H scale. Filaments white. Stigmata and immature seeds pink. Capsules M. Seeds tubercled.

46. Stems prostrate, 5.2 dm. with little anthocyanin. Flowers 6 to 15. Calyx H, with little anthocyanin. Petals and segments overlap, H scale. Filaments white. Stigmata and immature seeds pink. Capsules M. Seeds armadillo.

47. Stems very prostrate, with no barren shoots, 5.0 dm., with medium amount of anthocyanin. Flowers 9 to 15. Calyx H-V, with little anthocyanin. Petals and segments overlap, H scale. Filaments and stigmata white. Immature seeds pink. Capsules H-M. Seeds weak armadillo.
48. Stems prostrate, 4.5 dm., with medium amount of anthocyanin. Flowers 5 to 7. Calyx H, with medium amount of anthocyanin. Petals overlap, segments diverge, H scale. Filaments and stigmata white. Immature seeds pink. Capsules M. Seeds armadillo.
49. Stems 3 to 7. Calyx H-V, with medium amount of anthocyanin. Petals and segments overlap, H scale. Filaments and stigmata white. Immature seeds pink. Capsules M. Seeds tubercled.
50. Stems very prostrate, with few barren stems, 5.2 dm., with medium amount of anthocyanin. Flowers 6 to 10. Calyx H-M, with little anthocyanin. Petals and segments overlap, H scale. Filaments and stigmata white. Immature seeds pink. Capsules M. Seeds armadillo.
51. Stems very prostrate, 4.7 dm., with medium amount of anthocyanin. Flowers 4 to 7. Calyx H, with little anthocyanin. Petals and segments overlap, H scale. Filaments, stigmata, and immature seeds white. Capsules H. Seeds armadillo.
52. Stems prostrate, 5.0 dm., with medium amount of anthocyanin. Flowers 7 to 12. Calyx H, with medium amount of anthocyanin. Petals and segments overlap, H scale. Stigmata white. Filaments and immature seeds pink. Capsules H. Seeds tubercled.
53. Stems prostrate, 5.0 dm., with little anthocyanin. Flowers 5 to 7. Calyx H-M, with medium amount of anthocyanin. Petals overlap, segments diverge, H scale. Filaments and stigmata white. Immature seeds pink. Capsules M-H. Seeds weak armadillo.
54. Stems prostrate, with few barren shoots, 4.5 dm., with much anthocyanin. Flowers 7 to 9. Calyx H, with medium amount of anthocyanin. Petals and segments diverge, H scale. Filaments and stigmata white. Immature seeds pink. Capsules H. Seeds tubercled.
55. Stems very prostrate, 4.5 dm., with medium amount of anthocyanin. Flowers 3 to 7. Calyx V-H, with medium amount of anthocyanin. Petals and segments overlap, H scale. Filaments and stigmata white. Immature seeds pink. Capsules H. Seeds tubercled.
56. Stems prostrate, 5.0 dm., with much anthocyanin. Flowers 4 to 7. Calyx H-M, with medium amount of anthocyanin. Petals diverge, segments overlap, H scale. Filaments and stigmata white. Immature seeds pink. Capsules V-H. Seeds strongly tubercled.
57. Stems prostrate, 3.5 dm., with a medium amount of anthocyanin. Flowers 2 to 5. Calyx V, with medium amount of anthocyanin. Petals diverge, segments overlap, H scale. Stigmata white. Filaments and immature seeds pink. Capsules V-H. Seeds strongly tubercled.
58. Stems prostrate, 4.5 dm., with medium amount of anthocyanin. Flowers 3 to 6. Calyx H-M, with medium amount of anthocyanin. Petals and segments overlap, a few petals multilobed, H scale. Filaments and stigmata white. Immature seeds pink. Capsules M. Seeds armadillo.
59. Stems prostrate, 3.7 dm. with little anthocyanin. Flowers 3 to 7, regular. Calyx H-M, with little anthocyanin. Petals and segments overlap, H scale. Filaments and stigmata white. Immature seeds pink. Capsules M. Seeds weak armadillo.
60. Stems very prostrate, 4.5 dm., with medium amount of anthocyanin. Flowers 3 to 7, regular. Calyx M, with little anthocyanin. Petals and segments overlap, good scale. Filaments and stigmata white. Immature seeds pink. Capsules M. Seeds armadillo.

61. Stems very prostrate, with few barren shoots, 5.5 dm., with little anthocyanin. Flowers 15 to 17. Calyx V, with medium amount of anthocyanin. Petals overlap, segments diverge, H scale. Filaments and stigmata white. Immature seeds pink. Capsules H-M. Seeds tubercled.
62. Stems sub-erect, with few barren shoots, 4.0 dm., with little anthocyanin. Flowers 2 to 5. Calyx H-M, with medium amount of anthocyanin. Petals overlap, segments diverge, H scale. Filaments and stigmata white. Immature seeds pink. Capsules M. Seeds weak armadillo.
63. Stems prostrate, 3.0 dm., with much anthocyanin. Flowers 3 to 7. Calyx H-V, with medium amount of anthocyanin. Petals and segments overlap, H. scale. Filaments and stigmata white. Immature seeds pink. Capsules, H. Seeds tubercled.
64. Stems very prostrate, 4.5 dm., with medium amount of anthocyanin. Flowers 3 to 5. Calyx H, with little anthocyanin. Petals overlap, segments diverge, H. scale. Filaments white. Stigmata and immature seeds pink. Capsules M. Seeds armadillo.
65. Stems prostrate, with few barren shoots, 4.2 dm., with medium amount of anthocyanin. Flowers 4 to 7, regular. Calyx M-H, with little anthocyanin. Petals and segments overlap, H scale. Stigmata white. Filaments and immature seeds pink. Capsules M. Seeds armadillo.
66. Stems sub-erect, with very few barren shoots, 3.5 dm., with little anthocyanin. Flowers 2 to 5. Calyx M-H, with medium amount of anthocyanin. Petals and segments overlap, H scale. Filaments and stigmata white. Immature seeds pink. Capsules M. Seeds tubercled.

Summary and conclusions.

The offspring obtained from seeds of unprotected flowers of a wild hybrid between *Silene vulgaris* and *S. maritima* have been analysed for certain characters. The immediate seed parent was growing on the edge of a large population of *S. maritima* and the offspring no doubt had a considerable number of different pollen parents. The various combinations and modifications of characters, derived from the two species, show clearly how chance and infrequent crossings can increase polymorphism and heterozygosity within a cross-pollinated population of what would normally be regarded as a species. As would be expected from the history of the plants scored the influence of *S. maritima* is on the whole greater than that of *S. vulgaris*.

The research on which this paper is based has been aided by a Royal Society Government Grant.

LI.—MISCELLANEOUS NOTES.

THOMAS FORD CHIPP, M.C., Ph.D., D.Sc.—We record with deepest regret the sudden death of Major T. F. Chipp, the Assistant Director, at his house on Sunday evening, June 28th.

Born in 1886 at Gloucester, where his father was Chief Constable, he was educated at the Royal Masonic School, Bushey, and was Secretary of the School Natural History Society. His taste for natural science led him to take up horticulture, and after a period of service in the gardens of Syon House he entered Kew in 1906 as a Student Gardener. After a few months in this capacity, he was selected, owing to his marked ability, for one of the Temporary Technical Assistant posts in the Herbarium, where he remained until

1908. During this period he prepared himself, in his spare time, for the B.Sc. examination, London University, which he passed in 1909 with Honours in Botany. He then received an appointment as Demonstrator in Botany at Birkbeck College and in 1910 was appointed an Assistant Conservator of Forests in the Gold Coast. Before proceeding to West Africa he spent a year studying Forestry in Germany and the Federated Malay States.

In 1914 Chipp was appointed Assistant Director of the Botanic Gardens at Singapore, but the war starting while he was in England en route for the Straits Settlements, he at once sought permission to rejoin his territorial regiment, the 8th Middlesex, in which he had held the rank of Captain. With his regiment he proceeded to Gibraltar and subsequently to France, where he served continuously until 1919, being ultimately attached to the Staff with the rank of Major, and was awarded the Military Cross.

In 1919 he proceeded to Singapore to take up the post of Assistant Director to which he had been appointed five years earlier.

Chipp's good work while Assistant Conservator of Forests in the Gold Coast had been duly noted and in 1921 he was invited to return to be Deputy Conservator of Forests in that Colony.

His career both at home and in the Colonial service had naturally also been closely followed at Kew with interest and appreciation, and on the retirement of Sir David Prain in 1922 and the promotion of the present Director, Major Chipp was invited to occupy the vacant post of Assistant Director of the Royal Botanic Gardens, Kew, and assumed office on August 1st, 1922.

A fuller account of his many activities and of his contributions to science will be published later, but it should be recorded here that Chipp was a most loyal colleague, always bright, happy and filled with unbounded energy and enthusiasm for his work. He placed his work and his duties as Assistant Director of Kew in the foremost place at all times and carried them out with commendable precision, accuracy and devotion.

Having started his career at Kew as a Student Gardener, he found time to look after the welfare and interests of the Student Gardeners and entered fully into their activities and spared no pains to help their advancement.

By sheer hard work, late and early, he prepared himself for his University courses, and as the result of his research work, carried out mainly in his own time, he was awarded the Ph.D. degree and later the D.Sc. by his University.

Chipp was an organiser of high ability, tactful and reliant; doubtless his experiences on the Staff during the war greatly developed his organising ability and his sense of the value of law and order in arrangement.

His untimely death, at a time when men of his calibre and powers are all too rare, is a greater loss than Kew has ever before been called upon to bear.

Botanical Magazine.—Part iii. of vol. cliv (1928) has now been published and contains the following plant portraits:—*Inula magnifica cyclophylla* Stapf (t. 9227), a new subspecies described by Dr. Stapf from the Orient; *Gaultheria caudata* Stapf (t. 9228), a new species from China raised from seed collected by Forrest, probably in S. W. Yunnan; *Rhododendron parvifolium* Adams (t. 9229), from Siberia; *Scilla bithynica* Boiss. (t. 9230), a native of S. W. Asia Minor and E. Bulgaria; *Lycaste suaveolens* Summerhayes (t. 9231), a new species, closely allied to the well-known *L. aromatica*, probably from Central America, and grown in England under the name *L. aromatica* var. *maius*; *Osmanthus armatus* Diels (t. 9232), a rare shrub from the woods of W. Hupeh and S. E. Szechuan; *Chamaelaucium uncinatum* Schauer (t. 9233), the Geraldton Waxflower of Western Australia; *Piptanthus concolor yunnanensis* Stapf (t. 9234), a new subspecies raised from Forrest's seed, a native of N. W. Yunnan to the Tibetan frontier; *Plectranthus chiradzulensis* Baker (t. 9235), figured from a plant raised by Sir John Ramsden, the species being native in Tropical E. Africa; *Berberis mitifolia* Stapf (t. 9236), a new species allied to *B. brachypoda* C. K. Schneider from N. W. and W. Hupeh; and *Codonopsis meleagris* Diels (t. 9237), collected by Forrest in Yunnan.

Dissotis mirabilis Bullock (K.B. 1931, 99).—When describing this species it was unfortunately overlooked that Scott Elliott's no. 7480, a very incomplete specimen referred to it, had been cited by Gilg in Engl. Monogr. Afr. Pflanz. ii. 18 (1898) as the type of a new species, *Dissotis macrocarpa*. Owing to insufficiency of material, Gilg's account of that species was not quite satisfactory, the bracts for example being described as without nerves, and the receptacle as subglobose or subpyriform, whereas it is cupular or (at most) suburceolate. These discrepancies led to *D. mirabilis* being described as a distinct species. It now becomes a synonym of *D. macrocarpa* Gilg, which name should be associated with the more adequate description supplied under *D. mirabilis*.
A. A. B.

Serdang Experimental Plantation, F.M.S.—The remarkable progress that has been made at Serdang in experimental work in tropical agriculture and in establishing a most comprehensive collection of tropical economic plants during the short period of ten years is an achievement on which the Department of Agriculture is to be highly congratulated. The recent appearance of a detailed guide book,* replete with numerous illustrations and a plan of the station, should be of assistance to those not

*"Guide to the Government Experimental Plantation, Serdang, F.M.S.," by the Staff of the Agricultural Division, Department of Agriculture, S.S. and F.M.S. Kyle, Palmer and Co. Ltd., Kuala Lumpur, F.M.S., 1931, pp. 141, plates 12, diagrams 6. Price \$2.

familiar with this experiment station in realizing the magnitude of the plantation work and the extent of the progress made. In the first few chapters an account is given of the history and development of the station and of the prevailing soil and climatic conditions. This is followed by an account of the numerous crops and economic plants that are in cultivation, a chapter being devoted to each economic group. Separate accounts are given of the arboretum, factories and machinery, and stock farm.

In view of the increasing interest in the Oil Palm (*Elaeis guineensis* Jacq.) as a plantation crop in Malaya, experimental work on this crop has received special attention at Serdang. A most informative summary—occupying twelve pages—of the work done up to the present is given in the guide.

Among the more important plant introductions, the success that has attended the cultivation of those species yielding Chaulmoogra oil—*Hydnocarpus* spp. and *Taraktogenos Kurzii* King—is of special interest. Other tropical medicinal plants that are grown with success are Ipecacuanha and *Chenopodium*.

In the section devoted to fibre plants an account is given of the behaviour at Serdang of most of the more common tropical fibre plants. The remarks on Sisal are of special interest in view of increasing importance of this fibre on the markets of the world.

F. N. H.

Florae Siamensis Enumeratio.*—Part 4, completing vol. i., has appeared and comprises the families Rosaceae to Cornaceae. This part contains records of 647 species. Of these 127 are new species first described for this work by Prof. Craib or Miss Geddes, mostly in the *Kew Bull.* for 1928, 1929 and 1930. A few were described in the *Gardeners' Chronicle*. Fifty-one new varieties are also noted and 12 new combinations. An index to families and genera in the volume is supplied and also a statement of the actual day of publication of each of the 4 parts.

Those familiar with the previous parts will remember that the work is not descriptive. It gives the synonymy and distribution with collectors' numbers and localities, together with local names and distribution, of each species known to occur in Siam. For new varieties not previously described a few lines of diagnosis are given. It is to be hoped that eventually a comprehensive map will be furnished, for many of the localities are not to be found in atlases.

C. E. C. F.

*A list of the Plants known from Siam with records of their occurrence, by W. G. Craib. Vol. i, Part 4. Published under the auspices of the Siam Society by The Bangkok Times Press, Ltd., Bangkok; Luzac & Co., London, 1931, pages viii+247. Price 12s. 10d., or Tcs. 7.

Printed under the authority of HIS MAJESTY'S STATIONERY OFFICE,
By the South Essex Recorders, Ltd., High Road, Ilford.

(422) Wt. 115/29 1M 7/31 S.E.R. Ltd. 6p. 9.